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DENVER, COLORADO, September 18, 1909.

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DEAR SIR,—I have the honour to submit herewith my report on the 'Treaty with the United States relating to Boundary Waters and Questions arising along the Boundary between Canada and the United States, signed at Washington, January 11, 1909.'

As frequent reference is made therein to my report to you, of date April 22, 1908, on the same subject matter, I have attached copy of that report hereto.

Respectfully submitted,

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REPORT ON TREATY RELATING TO BOUNDARY WATERS AND QUESTIONS ARISING ALONG THE BOUNDARY BETWEEN CANADA AND THE UNITED STATES.

Thorough and careful consideration of the provisions of the 'Treaty with the United States relating to Boundary Waters and Questions arising along the Boundary between Canada and the United States, signed at Washington, January 11, 1909,' so far as these provisions affect the waters of the St. Mary and Milk rivers and their tributaries, compels the conviction that they are greatly unjust to the interest of Canada, and for the following reasons.

(a) The 'equal apportionment' provided for does not take cognizance of the relative area possible of reclamation in each country and, consequently, does not 'afford a more beneficial use to each'—but only to the United States.

(b) Such apportionment does not recognize, as a vested right, the prior appropriations made by Canada on the St. Mary river.

(c) Such apportionment does not provide for a periodic division of the waters which only can result in 'a more beneficial use to each.'

(d) Such apportionment does not provide Canada with a fair compensation for the valuable consideration granted to the United States—the use of the channel of the Milk river for the conveyance of water for irrigation purposes.

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(e) The treaty fails to provide any compensation to Canada for the maintenance of the channel of the Milk river, or any clearly defined and adequate means of redress in the event of injuries that will inevitably result from its use by the United States in the manner provided.

(f) The composition of the International Joint Commission is defective and there is lack of provision of methods for its guidance and operation.

It will be the purpose in the following review and report to consider these and all other features of this most important matter, fully and in detail, in order that every item may be adequately presented and carefully weighed, before the government of Canada finally decides upon a settlement of policies that will have vital and far reaching effects upon the present and future welfare of Southern Alberta.

Before, however, considering the general effect of the conditions proposed in the treaty, it may be advisable to refer to some details which have been apparently misunderstood.

It would appear, first, that it has been understood that, although the Alberta Railway and Irrigation Company have a commitment of 2,000 cubic feet per second against the St. Mary river, they never could develop more than 800 cubic feet per second, because the spring waters are speedily exhausted and that there is a very small amount of water availbale during the summer.

The facts are that the company operates under an authorization of date May 3, 1899, granting it 500 second feet of the low flow and 2,000 second feet of the high or flood flow of the stream, with fifteen years from October 23, 1902, in which to complete its work. At the present time, the company have a canal system capable of diverting 800 cubic feet per second from the St. Mary river, and thereby have developed 40 per cent of their authorization in 47 per cent of their allotted time, seven years out of 15.

Considering the normal stream flow, as shown on Table A. page 54 of this report, the mean discharges, during the irrigation season from April 1 to November 1 are as follows:—

April..	679.5	cubic feet per second.
May..	1,798.4	“ “
June..	3,864.4	“ “
July..	2,301.5	“ “
August..	1,039.9	“ “
September..	679.0	“ “
October..	591.0	“ “

From that, it will be seen that the stream affords an ample supply of water in every month of the irrigation season to satisfy the authorization of 500 cubic feet per second of the low flow and in May, June and July practically the authorization of 2,000 cubic feet per second of the high or flood flow with the normal flow in May slightly below that amount and that of June nearly twice the necessary quantity.

In the practical operations of an irrigation system, the full volume is not actually required in every month of the irrigation season. I have elsewhere shown that the company rarely flow water through their canal system prior to May 1, and with the full volume supplied during May, June and July, the actual requirements would decrease to 50 per cent in August and to 20 per cent in the other months of the season.

I would call attention to the remarks made by me in my report to Dr. King, April 22, 1908, on the position of the Alberta Railway and Irrigation Company. It would not have been the part of ordinary commercial prudence for them to construct a canal to the full capacity of their authorization at the inception of their enterprise. The country to be irrigated was then an unsettled desert, irrigation was, in a sense, experimental, and years would have elapsed, as has been shown,

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before full demand was made on that capacity, and there would have been a long interval with a large investment in part unproductive. They did begin with a canal capacity of 400 second feet, have now enlarged it to a capacity of 800 second feet, keeping pace with the actual demands made upon them by the requirements of the settlers, and could proceed with development on that sound basis to the limit of their authorization.

The effect upon their enterprise of conditions that now limit them to 500 cubic feet per second, in place of their actual development of 800 feet, must be at once recognized and will be more fully considered later in this review.

It is sufficient, for the moment, to have pointed out that it is not because of the exhaustion of the stream flow in the summer months but because of the exercise of ordinary business prudence and the time required in the upbuilding and settlement of great areas, that a greater development than 800 cubic feet per second has not been made at this time.

And I may incidentally mention that the flows of the stream quoted above and incorporated in the tables prepared are from data in the reports of the United States bureaus, which I do not think, for reasons elsewhere given, quite accurately state the river discharge within Canadian territory.

It has also been understood, apparently, that when these storage works proposed to be constructed by the United States at the headquarters of the St. Mary river, are completed, the Canadians will have the benefit of them and will have a store of water to draw from during the summer, in place of having it now only during the spring and fall.

The quantities of the normal flow of the stream, during the irrigation season, show, on the contrary, that there is an ample supply during the summer months,—that is, May, June and July, for the full amount of the authorization. It would be during these months that the flood or excess waters would be stored. Even August would supply 50 per cent of the full authorization, sufficient for real requirements at that time, and for the rest of the season the normal flow would be adequate for the actual necessities, if these were based only upon a development of the area irrigable by the full amount of the authorization—2,000 second feet.

But no broad conception of the development under the authorization can be had that does not or did not contemplate the ultimate storage of flood waters of the St. Mary river, as a Canadian enterprise itself.

There is, however, nothing in the treaty that would indicate that Canada would enjoy any benefit in the reclamation works, the storage works, proposed by the United States, or would thereby have a store of water to draw upon during the summer.

Such a thing is certainly not contemplated by the United States, though both the second and third annual reports of the reclamation service for 1902-3 and 1903-4 contain this paragraph:

To thoroughly settle the question of water diversion from St. Mary river and Milk river, it will probably be necessary to come to some international agreement with Canada. This country has the advantage of storage in St. Mary lakes by the construction of the St. Mary dam in which the flood waters of this stream can be conserved and afterwards used for irrigation purposes. An agreement might be made with the Canadian government to allow to pass down, without diversion, the water turned into Milk river, on condition that the Canadian canal from St. Mary river will be furnished sufficient water from the St. Mary reservoir.

But, if the United States ever seriously considered an agreement of that kind, it was to reject it. A later official communication contained the provision that

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Canada should allow to pass down without diversion, the water turned into Milk river, but withdrew the countervailing provision of sufficient water from the St. Mary reservoir.

In the communication from Elihu Root to the Governor General, June 15, 1907, clause 8 reads as follows:

That Canada shall, in no event, divert from the Milk river any portion of the stored St. Mary river water turned into the Milk river system by the United States, due allowance being made for losses by evaporation and seepage, while passing through the channels of the Milk river system as fixed by the commission provided for in paragraph 14.

And nowhere, in that communication or any other document, is any proposal made that the United States will turn down the St. Mary river from the St. Mary reservoir any water stored by it.

From that, it would seem to be abundantly manifest that there is no provision for Canada sharing the water stored by the United States.

The treaty proposes, in broad terms, that there shall be an equal apportionment of the waters of the rivers; that the United States shall own and control, for its own use, one-half of the water of the St. Mary river and the Milk river, which it proposes to store and ultimately use within its own territory. It does not propose to store any water it can secure from the St. Mary river, under arrangement with Canada, and ultimately permit Canada to draw upon that stored supply.

Canada may take its own half of the water of the St. Mary river, in which, under one reading and probably the correct reading of the treaty, shall be included the 500 cubic feet per second conceded to it as a prior appropriation,—and do with that one-half of the water what it pleases; use it in direct application, store it for future use, or allow it to pass down the stream to be ultimately ‘lost in Hudson Bay.’ But Canada will have, in the event, no claim upon any water of the stream or streams diverted or stored by the United States.

It has apparently been concluded that it would be impossible for the United States to join these two streams into one without the construction of the storage reservoir at St. Mary lakes.

This is an entirely erroneous conception of the situation.

I am thoroughly familiar with the district in all its bearings on this proposed diversion of water from the St. Mary river to lands in eastern Montana through the channel of Milk river and know absolutely that such diversion can be made without raising the level of the bed of the St. Mary river at the point of diversion, and without creating a storage reservoir by the construction of any embankment or dam.

Such, indeed, was originally contemplated by the United States.

In the report of the ‘Hearings before the Committee on Public Lands of the House of Representatives, January 11 to 30, 1901,’ Mr. F. H. Newell, who was then Chief of the Division of Hydrography, U.S. Geological Survey, said, page 51:—

In northern Montana, the principal project is not a water storage plant, but the diversion of the St. Mary river, which receives water from the snow covered summits of the high Rockies and carries it north into Canada. By a comparatively short canal, one which does not offer any great engineering difficulties, the headwaters of that stream can be taken out and turned into the headwaters of the Milk river, which flows easterly and enters Missouri river in eastern Montana.

And, on the next page, 52, Mr. Newell gives an estimate of the cost of the first nine miles, the only portion then cross-sectioned, in a total of \$325,000, in which is included \$10,000 for ‘dam and head-gates’—which is merely for diversion dam and regulating head-gates of a diversion canal only.

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In 1902, the Senate Committee on the Reclamation of Arid Lands published a report, No. 254, which opens thus:—

The proposed St. Mary diversion canal is for taking water from the St. Mary river, in northern Montana, and carrying it across gravel ridges to the headwaters of Milk river.

And in all that follows in that report there is no mention of a storage reservoir on the St. Mary river.

Early in 1902, and a very short time after the publication of Report No. 254, the Geological Survey published 'a condensed statement taken from the report on the St. Mary canal project' which contains the first reference to storage on the St. Mary and reads as follows:—

The St. Mary project is designed to store flood waters in the St. Mary lakes in northern Montana and conduct these easterly by a canal cut through the ridges at the head of Milk river.

Further along, in the said 'condensed statement,' the following occurs:—

It is proposed to build a low storage dam at a point about three-fourths of a mile below the present outlet of lower St. Mary lake. This dam will have a maximum elevation of 50 feet above the bottom of the river and will form a reservoir of a capacity of 250,000 acre feet.

And still further on, in the 'Estimated Cost of St. Mary Dam and Canal to North Fork River'—the cost of this dam is given as \$22,000.

In the 'First Annual Report of the Reclamation Service from June 17 to December 1, 1902, issued early in 1903, the statement is made, page 206, that,

An examination of St. Mary lakes and rivers was begun in 1900 by Mr. Gerard H. Matthes, and it was ascertained that a diversion canal could be carried over the divide to the headwaters of the Milk river.

Further, pages 207 and 208, a statement is made of the reservoir that can be created at the St. Mary lakes, in exactly the same words as quoted above from the 'condensed statement.'

From that time, each succeeding report of the Reclamation Service refers to the storage at St. Mary lake in the same general terms and usually in precisely the same language until the sixth report for 1906-1907, when, for the first time, the reduction of the height of dam and capacity of the reservoir is indicated, as follows:—

It is proposed to build a low storage dam about three-quarters of a mile below the present outlet of lower St. Mary lake. The dam will have a maximum elevation of 45 feet above the bed of the river. The effective height will be 30 feet. The reservoir thus created will have a capacity of 150,000 acre feet. (Page 115.)

It is undoubtedly a fact that it is physically possible for the United States to build a canal from the bed of St. Mary river to the headwaters of the Milk river that will divert directly, without the necessity of any storage works, all the water

NOTE.—There is so much in this 'condensed statement' that is well worth perusal, though it may not be pertinent to the consideration at the present time, in view, alone, of the change of thought that has occurred in the interval, that it is attached hereto as Appendix.

Attention is especially directed to the statements that 'it is not believed that any international complication can arise concerning water rights, since the water which it is proposed to store and divert occurs wholly within Montana, and it would be impossible for the Canadians to store and utilize this flood water, even if needed in their canal,' and that 'Milk river in Canada from the junction of the North and South Forks down stream, has a very slight fall, not more than two feet to the mile, and a canal of 100 miles or more in length would be necessary before the water could be brought to the upper benches. It is not, therefore, considered feasible to divert the waters from Milk river in Canada.'

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to which it would be entitled from the St. Mary river in the equal apportionment provided by the treaty.

The treaty does not make it obligatory upon the United States to construct a reservoir or reservoirs at the St. Mary lakes, or elsewhere; it was probably never contemplated that any such obligation should be a condition precedent to the agreement.

The character of the stream flow is such that, during the irrigation season only, the United States, if it so desired, would be able to secure its share of the St. Mary river, on the terms of the treaty, by direct diversion simply and without any storage at St. Mary lake, or partly by direct diversion and partly by storage in total quantity less than the lowest reservoir capacity recently considered by the Reclamation Service.

These features will be considered in detail and at length later. Meantime, their presentation has probably been sufficient to suggest the position of Canada and Canadian users of water on both the streams affected. The St. Mary river in Canada could be greatly depleted in volume during the irrigation season, during the summer, and the Milk river greatly augmented in volume, without any benefit to any interest in Canada above what is possessed to-day.

The first paragraph of Article 6 of the treaty states that the 'equal apportionment' is provided 'so as to afford a more beneficial use to each' of the High Contracting Parties.

That beneficial use can best be secured by consideration of the relative areas in each country, that can be reclaimed by irrigation.

It is because the water supply of the Milk river in Montana is at present inadequate for the needs of the area irrigable by it, that the United States seeks to increase that supply by the addition of waters stored on or diverted from the St. Mary river.

The extent of that area can only be ascertained from the reports of the United States Reclamation Service and in these reports has been variously stated at various times.

In the seventh and latest annual report of the Reclamation Service for 1907-8, it is stated as follows:—

Irrigable area, 200,000 acres. Ownership 10 per cent public, remainder private.

In the sixth report, for 1906-7, it is given, thus:—

Irrigable area, 250,000 acres, in the valley of the Milk river. Ownership of land: 50 per cent government land; 50 per cent in private ownership.

In the fifth report, for 1905-6, in the 'Summary of Data,' it is stated:—

Irrigable area, 200,000 acres, extending 150 miles along valley of Milk river.

While, in the body of the report there is the following:—

The Milk river project as surveyed includes over 250,000 acres divided into two divisions, (1) 91,000 acres near Chinook and Harlem, (2) 159,000 acres extending from the Dodson diversion dam eastward to Glasgow.'

But, in a table of the 'distribution of lands' immediately below the statement quoted above, it is given as

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General Lands.

	Acres.	Per cent.
Total..	250,000	..
Private..	121,000	48
Public..	129,000	52
Irrigable..	215,000	86
Non-irrigable..	35,000	14

While, in the two divisions, there is given

	Acres Irrigable.
Chinook system..	77,000
Dodson system..	143,000
Total..	220,000

as compared with 215,00 acres irrigable in the general statement.

That area had previously been considered by me (see my report to Dr King, April 22, 1908 (page 41) as the extent of the irrigable acreage in the United States, but it would appear to be proper to now limit that to 200,000 acres in view of the later report.

At pages 2 and 3 (report to Dr. King, April 22, 1908) I made the following statement, from the actual surveys made under my own supervision, while acting as consulting engineer for the Alberta Railway and Irrigation Company:—

Surveys were projected which developed the fact that, tributary to the canal system projected from the St. Mary river there were 450,000 acres capable of irrigation and under the system from Milk river,—180,000 acres.

That means that there would be a total area of 630,000 acres susceptible of irrigation from these streams within Canadian territory.

The relation of apportionment of the water supply should consequently be, for 'the most beneficial use to each.'

United States..	200,000 acres.
Canada..	630,000 "

To ascertain the mean volume of water available from both the St. Mary and Milk river, I have, in addition to the Tables A and B in report to Dr. King, April 22, 1908, drawn up Tables A and B attached to this report.

These embrace the latest information of the stream flows up to the end of the year 1908 and vary slightly from those previously submitted, as they have been affected by the volumes in the additional years.

There would then be available, normally

From St. Mary river..	769,374 acre feet.
From Milk river..	231,820 "
Total..	1,001,194

One-half of that amount, 500,597 acre feet, would represent, upon the 200,000 acres irrigable in the United States, a duty of water of $2\frac{1}{2}$ acre feet per acre per annum; upon the 630,000 acres irrigable in Canada, a duty of water of less than 0.8 (eight-tenths) of an acre foot per acre per annum, or the United States would secure a water service three times the efficiency of that secured by Canada.

In all of the reports of the Reclamation Service which refer to the Milk river project, the requisite duty of water is stated at 2 acre feet per acre per annum, though in the sixth annual report, page 11, it is said:

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The average duty of water, from measurements taken on private canals, is 18 inches.

or $1\frac{1}{2}$ acre feet per acre per annum.

In this 'equal apportionment' of the waters of the combined streams, the United States secures 25 per cent more water than the Reclamation Service officers are of opinion is requisite for the ultimate area irrigable in the project.

Canada secures only 40 per cent of the requisite amount. If the duty of 2 acre feet per acre per annum is the volume necessary for successful cultivation, 250,000 acres only can be reclaimed in Canada. Southern Alberta, in other words, must abandon all hope of reclaiming 380,000 acres of land.

It may be suggested that the United States can irrigate an additional 100,000 acres in the Blackfeet Indian reserve directly from the St. Mary river, by the 'St. Mary Project.' Upon that subject, however, the seventh annual report of the Reclamation Service, for 1907-8, says, page 111:

If satisfactory arrangements can be made with Canada for carrying through Milk river in that country waters diverted from the St. Mary river, in the United States, into the headwaters of the Milk river, the irrigation features of the St. Mary project will be abandoned.

It may also be suggested that Canada could not, in any event, provide sufficient water supply for 630,000 acres, Table E, page, 66, (report to Dr. King, April 22, 1908) shows the combination of the mean flows of the St. Mary and Milk rivers, and the distribution of water between Canada and United States, on a fair and equitable basis. On such distribution, Canada would secure 601,681 acre feet, for an area of 630,000 acres, or a duty of 0.95 acre feet per acre per annum, while the United States would secure 338,900 acre feet for 200,000 acres, or practically 1.7 acre feet per acre per annum, which is in excess of the 18 inches duty of water found on private canals in the United States.

Table F, page 67, of the same report, shows the combination of flows of the St. Mary and Milk rivers in 1903, a year of maximum discharge, in which Canada, on the same fair and equitable distribution, would receive 808,990 acre feet for 630,000 acres, or a duty of 1.28 acre feet per acre, while the United States would receive 604,820 acre feet for 200,000 acres, or a duty of 3.02 acre feet per acre.

With conditions as they are, the St. Mary river alone discharges a mean flow of 769,374 acre feet and a maximum flow of 1,107,294 acre feet, as in 1903, which would give 1.22 acre feet and 1.76 acre feet for 630,000 acres.

It has been assumed by the United States, as evidenced by the official reports, that Canada has no opportunity within its own territory to store water.

In the 'condensed statement,' already quoted from and attached as an appendix, it is said:

It is not believed that any international complications can arise concerning water rights, since the water which it is proposed to store and divert occurs wholly within Montana, and it would be impossible for the Canadians to store and utilize this flood water, even if needed in their canal.

This statement was modified in the fourth annual report, page 179.

It (the Alberta Railway and Irrigation Company) has also under construction the development of a storage system. There are no reservoirs directly on the two main streams, but there are a number throughout the area controlled by the canals. The system as at present constructed does not utilize these reservoirs, but it may be possible to utilize them by enlarging the canals at considerable expense.

At pages 3 and 4, my report to Dr. King, April 22, 1908, I have given a statement of the reservoir sites known in Canada, showing a total capacity of 589,889

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acre feet, with some not then surveyed. The cost of development of these will be reasonable and the cost of enlargement of the canal system to fill them, which would be, in any event, part of the development to reclaim the area of 630,000 acres, would be low, and much less than that being incurred by the United States in similar projects in Montana and elsewhere.

That total area in Canada can be economically reclaimed by irrigation, and the water supply of the St. Mary and Milk rivers is ample for that purpose, making ample allowance for the vested rights of prior appropriations within the United States. The amount of water which will be secured by Canada, under the provisions of the proposed treaty, will be inadequate for that area and will be an inequitable division in relation to the possible areas reclaimable in each country.

The treaty does not recognize, as a vested right, the prior appropriation of Canada on the St. Mary river.

It apparently does so in the statement 'that Canada is entitled to a prior appropriation of 500 cubic feet per second of the flow of the St. Mary river,' but the recognition is more apparent than real, as the following words show, 'or so much of such amount as constitutes three-fourths of its natural flow.'

If Canada is entitled to a prior appropriation of 500 cubic feet per second, it would be entitled, during the irrigation season, at least, to all of the natural flow of the St. Mary river that was not in excess of that amount. That proposition is so axiomatic in the arid region as to require no argument.

When the treaty provides for an amount three-fourths of the natural flow of the stream to satisfy a 'prior appropriation,' it thereby fails to recognize the doctrine of priority of appropriation.

A few quotations on this feature from Mills' 'Irrigation Manual' are submitted:—

The fundamental principle of the customs and decisions prior to the enactment of any statutes governing the appropriation of water was 'first in time, first in right.' This idea of priority in point of time giving priority in point of right, has been made the basic principle of the irrigation law in all the legislative enactments in the arid and semi-arid states and territories. It becomes accordingly, the basic principal also of the doctrine of appropriation. (Section 54.)

As between those using water for the same purpose, priority of use gives the better right irrespective of the mode of diversion. (Section 56.)

Under the early rules and customs, the date of the appropriation, which also was the date of the priority, was fixed by the time an application of the water was made to a beneficial use. This rule or custom soon changed so that the date of priority was fixed not by the time the water was first beneficially applied but by the time when the work of construction was commenced; provided the work was diligently prosecuted and the water was beneficially applied within a reasonable time. (Section 57.)

The greater weight of authority is in favour of measuring the appropriation by the amount of water actually applied to a beneficial use, within a reasonable time. . . . The last rule, and one which can be applied to every appropriation, is that an appropriator should not be entitled to divert more water than with economy he can beneficially use for the purposes for which the appropriation was made. (Section 58.)

A prior appropriator does not acquire any title to, nor ownership of, the waters running in the natural channel of the stream; he does acquire, however, a right to the use of the water to the extent of his needs. . . . He is entitled to the natural flow of the stream to the extent of his priority undeteriorated in quality and undiminished in quantity. (Section 60.)

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I have discussed the position of the Alberta Railway and Irrigation Company, as a prior appropriator on the St. Mary river, at some length in my report to Dr. King, April 22, 1909, pages 42 to 47, inclusive, and suggest the careful consideration of that discussion in this connection.

I would draw particular attention to the phrase there quoted from a letter from the Hon. John Hay, then Secretary of State, of date 29th of December, 1902:

It is proposed to deal with this matter in strict conformity with the laws concerning the rights to the use of water as recognized by the courts of the arid region both on this side of the international boundary and on the other.

And I would once refer to the report of the consulting engineers, Messrs. Davis, Wisner and Savage, third annual report, page 306, in which they say:

It should also be emphasized that any recognition of rights for the diversion of water from Milk river are necessarily subject to the prior rights of inhabitants of Milk River valley, in Montana. . . . Neither the American nor the Canadian government has the right to interfere with prior appropriations either from St. Mary or Milk river.

Also, the communication from Elihu Root, Secretary of State, to the Governor General, June 15, 1907, contains the following:

4. That the period in each year not specified in paragraph 2, the United States may divert or hold back in storage reservoirs any portion of the material flow of St. Mary river; and Canada may divert any portion of the natural flow of Milk river: (In neither case to interfere with existing rights.)

And in response to that communication from Ottawa, addressed to Mr. F. H. Newell, undated, copied in my report to Dr. King, April 22, 1908, the following occurs:

Such agreement, it is believed, to secure acceptance by the people of both countries, and to fulfil its purpose of obviating all possible future contentions can best be based upon the principle of equal sharing of benefits to be derived from these International rivers, after due provision has been made for existing rights, and it is recognized that the proposal of the Secretary of State has been framed with the intention that the two countries shall stand upon an equal footing as to the use of these waters.

And it is now submitted that the proposals of the treaty under consideration are not in strict conformity with the rights to the use of water, that they do interfere with prior appropriations and do not make due provision for existing rights, certainly not for the Canadian appropriation on the St. Mary river.

That appropriation, as I have shown in report to Dr. King, would be recognized in any court of competent jurisdiction up to the full claim of 2,000 feet, and certainly to that of 1,400 second feet, which would be the least amount necessary to irrigate 210,000 acres directly tributary to it, and with due regard to diligence in the application to beneficial use. At the present time, the canal has a capacity of 800 second feet, and even that is not recognized by the treaty, which provides for only '500 cubic feet per second . . . or so much of that amount as constitutes three-fourths of the natural flow of the stream.

In the first place, the determination of the amount of the Canadian appropriation from the St. Mary river at 500 cubic feet per second is not just to Canada, it is not in accordance with the rule that the 'appropriator should not be entitled to divert more water than, with economy, he can beneficially use for the purposes for which the appropriation was made, 'nor is it in accordance with the facts. The appropriator can show that he can to-day beneficially use for the purposes for which the appropriation was made, more water than is stipulated in the treaty.

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It would appear, indeed, as if this determination of the prior appropriation from the St. Mary river had been made solely by the Reclamation Service officers of the United States, without any consideration of the claims of the Canadian appropriator, denying him, in brief, his 'day in court,' and largely for the purpose of giving a colour of equality with the appropriations of the United States from the Milk river, the manipulation of which will be fully considered later.

In the second place, the provisions of the treaty do not actually recognize even this 500 second feet as a prior appropriation, as an existing right.

It is incorporated in the 'equal apportionment' of the waters of the stream. At first perusal that is not apparent, probably because one had become accustomed to think of any division of the waters being made, after providing for such existing rights.

The treaty unquestionably means that 'for the purposes of irrigation and power,' the waters shall be 'apportioned equally,' but Canada shall be entitled first to draw, during the irrigation season, 500 second feet from the St. Mary river, out of its apportionment.

That amount of water, throughout the irrigation season of 214 days, from April 1 to October 31, represents 214,000 acre feet.

The total mean annual discharge of the St. Mary river is, as previously stated, 769,374 acre feet, one-half of which is 384,687 acre feet, so that according to the proposals of the treaty, the share of the St. Mary river water given to the United States is 384,687 acre feet, and the share to Canada, 384,687, less 214,000 acre feet, or 173,687 acre feet.

The 214,000 acre feet is not a chattel disposable by either the United States or Canada, it is the property of the appropriator who has acquired 'a right to the use of the water to the extent of his needs.' The Canadian appropriator can only be denied that right by the United States attempting to exercise the right of sovereignty over the waters of a flowing stream within its territory, which would seem to be avoided, at least, in the various official utterances quoted and which has been scrupulously ignored in the somewhat similar controversy with Mexico on the southern boundary.

It may be assumed, *prima facie*, that, in this regard, Canada and the United States are placed upon the same footing, each with 'a prior appropriation' of 500 cubic feet per second.

A very little consideration will show, however, a very great difference.

In the communication of Elihu Root, Secretary of State, to the Governor General, June 15, 1907, paragraph 9, reads as follows:—

The share of the United States shall in any event include so much of the available natural flow of the Milk river as shall be judicially determined as having been applied to beneficial use on or before November 1, 1905, by the canal systems taking water from the lower Milk river in Montana, the same to be measured at the intakes of said canal systems, and whenever one-half of the natural flow of the Milk river shall be less than such amount measured as afore-said, the share of Canada shall be diminished so that said country shall receive of the natural flow of the entire Milk river system only the excess, if any, beyond such amount of the decreed beneficial use. It is understood that the amount of water heretofore diverted for beneficial use from Lower Milk river in Montana as being in excess of 350 cubic feet per second, when the same was available.

In my report to Dr. King, April 22, 1908, I considered this feature, pages 48 to 50, incorporating tables from reports of the Reclamation Service which showed 'measured capacities' of private canals from the Milk river in the United States, in a total amount of 359 cubic feet per second and advising that Canada should

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have, or should certainly claim the right to be heard upon the judicial determination of these appropriations. The necessity for the exercise of that right will be very plain from the recital of what has transpired in this connection in the interval.

In the third annual report, Reclamation Service, page 300, it is found that

There are a number of small private systems of canals out of Milk river near Chinook. The Chain Lakes Reservoir will be above here, and it will, therefore, be necessary to adjudicate these vested rights before construction is started.

In the fourth annual report, page 183, it is stated that

A lawsuit for the adjudication of the water rights of these canals and others in the Milk River valley is now pending.

In the fifth annual report, page 153, is devoted to a recital of the regulation of the water in the Milk river during 1906, by the Reclamation Service, at the request of a committee of the private canal owners, pending a legal decision, the federal court having passed on one case only at that time.

In the sixth annual report, page 113, it was stated that,

Before the United States can safely begin any extensive works in the valley, it is necessary that the legal status of these various canals be determined.

The Appellate Court had confirmed the decision of the lower court in the Fort Belknap Indian case, and it was then before the Supreme Court of the United States; and,

On account of this federal suit, the private suit above referred to for the adjudication of the water rights of the entire valley has been postponed until a decision has been handed down from the Supreme Court.

In the seventh annual report, pages 108 and 109, this feature 'Adjustment of Water Rights' is considered at length and the following excerpts are made:

At the time authority was given, in March, 1908, for construction work on this project, it was understood that a general adjudication of the rights of all private canals would be necessary in order to determine the order of their priorities, but more especially to establish the amount of water to which each ditch was entitled. In order to avoid the expense and delay that would necessarily result from an adjudication of these rights by suits at law, as well as to expedite the construction of the Dodson system, certain articles of agreement were drawn under date of May 28, 1908, between various private canal companies in the vicinity of Chinook and Harlem, parties of the first part, the Upper and Lower Milk river water users' associations, parties of the second part, and the United States, party of the third part. This agreement provides in effect that as soon as an adequate supply of water shall be provided in the channel of Milk river from St. Mary river, or elsewhere, the owners of the various private canals will execute and deliver to the United States conveyance of their present water rights, dams, ditches, reservoirs and structures covering lands in the Milk River valley susceptible of irrigation from the proposed government irrigation systems. . . . The agreement further provides that the present appropriations of the ditch owners shall be measured by the maximum capacities of their ditches as estimated in the following table, and that the acreage hitherto irrigated shall be considered those shown on the table.

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Company.	Canal Capacity sec. feet.	Acres irrigated.
Fort Belknap Canal & Irrigation Co..	130	10,900
Winters, Anderson Ditch Co..	12	440
Paradise Valley Ditch & Irrigation Co..	19	1,400
New Harlem Irrigation Co..	73	7,820
Cooks Irrigation Co..	50	2,700
Matthewson Ditch Co..	28	1,715
West Fork Ditch Co..	13	800
Fort Belknap Indian Canal.. . . .	125	.....
Total.. . . .	450	25,755

Of that total quantity of 450 second feet, the first four and the last named ditch, only, draw water directly from Milk river, the others, in a total quantity of 91 second feet, draw from tributaries, leaving 359 second feet only, as prior appropriations from Milk river.

With prior appropriations amounting to 359 cubic feet per second, arrived at not by judicial determination but by private arrangement between parties, why should the treaty provide for 500 feet per second? It is important to remember in this connection that Canada has a subsequent appropriation on the Milk river, in the canal of the Alberta Railway and Irrigation Company on that stream, which can no more be ignored, in this apportionment of the waters of these streams, than the Canadian prior appropriation on the St. Mary river and the American prior appropriation on the Milk river. And the effect of swelling the American prior appropriations from the Milk river from 359 to 500 cubic feet per second will prejudicially affect the amount of water ordinarily obtainable by the Canadian appropriation.

During the irrigation season, there are only four months, April, May, June and July, during which the American appropriation of 359 cubic feet per second can be fully satisfied from the mean flow of the stream, and only three, April, May and June, when 500 cubic feet per second could be secured. And, while in the former case, the Canadian appropriation could receive, in the four months, 66,105 acre feet, in the latter, it would only receive 38,948.8 acre feet. (See Table C, which has been drawn up to show the effect of this difference in volume).

And it is only during these irrigation months, and only in these three or four mentioned, that the Canadian canal would be of any benefit to Canadian interests. It was designed and built solely for the purpose of diverting the flood waters of the stream during these months and storing them in reservoirs for use later in the season. It has a capacity, now, of 330 cubic feet per second and was designed not to interfere with American prior appropriations. That full capacity during April, May, June and July would represent a supply of 80,520 acre feet, of which, on the proposals in the treaty, with 359 second feet of prior appropriations, it would be able to secure 82 per cent, with 500 second feet, only 48½ per cent.

And, from the physical situation, it would not be able to secure more, even under the provisions of the treaty, as Canada is not in the position occupied by the United States of availing itself fully of the provision that more than one-half from one stream and less than one-half from the other. It has no connecting diversion canal, and while a greater portion might be taken by Canada from the St. Mary river, that water might, in all probability, be more beneficially required under the Milk river system in Canada. On that feature, more will be said in connection with the arrangement for carrying out the provisions of the treaty on the division of the waters.

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It must be very plain that, while the Canadian prior appropriation on the St. Mary river has been determined, for the purposes of this treaty, at $37\frac{1}{2}$ per cent less than the actual carrying capacity of the canal at this time, (500 compared to 800 cubic feet per second) the American prior appropriation on the Milk river has been determined at 39 per cent more than the actual carrying capacities of the canals dependent upon it. And that, not by the ordinary means of judicial investigation, but by private arrangements between the canal owners and the United States authorities.

It will also be very plain, of course, that the first water to be diverted from the St. Mary river, (note: the agreement does not say St. Mary reservoir) into the Milk river, is to be applied to making good existing claims, for which, ordinarily, the Milk river does not now furnish sufficient flow, as indicated in the last sentence of paragraph 9 of Secretary Root's communication, 'It is understood that the amount of water heretofore diverted for beneficial use from Lower Milk river in Montana as being in excess of 350 cubic feet per second, when the same was available.

It will be singularly unfortunate if Canada is committed to the 'equal apportionment' of the waters of those two streams, as provided in the treaty.

It has been clear, I believe, that such equal division is not an equitable apportionment in view of the areas reclaimable in each country, nor in the recognition of existing prior rights, and it is not in pursuance of the two documents from which quotations have been made, in the first of which, it is stated, 'in neither case to interfere with existing rights,' in the other, 'after due provision has been made for existing rights.' There is distinct interference with the existing Canadian right on the St. Mary river, and there is no provision for the existing Canadian right on the Milk river, while the evidence warrants the assertion that there has been a decided manipulation of existing American rights on the Milk river.

And it can further be said that the whole theory of the equal apportionment of the streams provided for in the treaty is wrong, because there is no recognition of the essentially different characteristics of the two rivers; the one, the St. Mary, is a perennial stream, furnishing a fair volume throughout the year, the other, the Milk river, is not—is frequently absolutely dry, especially at the point of intake of the Canadian canal.

This is best illustrated, I believe, not only by the statement that the mean annual flow of the St. Mary is 769,374 acre feet and of the Milk 231,820, but also by a comparison of the mean flows of each, in relation to the provisions of the provisions of the treaty.

In the St. Mary, the river, during the irrigation season, never falls below the amount provided as the first right of Canada, 500 cubic feet per second, as follows:—

	Cubic feet per second.
April..	679.5
May..	1,798.4
June..	3,864.4
July..	2,301.5
August..	1,039.9
September..	679.0
October..	591.

And, on the other hand, the Milk river is in excess of the American prior appropriation, of 500 cubic feet per second as provided in the treaty, in three months, and of 359 second feet, actually, in four months only of the irrigation season, as follows:—

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	Cubic feet per second.
April..	649.7
May..	630.4
June..	864.7
July..	383.1
August..	126.4
September..	102.5
October..	200.6

In the last three months of deficient flow, Canada's share would be, on the treaty provisions, 31.6, 25.6 and 50.1 cubic feet per second, while from the St. Mary river the United States would secure, in these months, 539.9, 179.0 and 91.6 cubic feet per second, respectively.

The objection to the treaty that it provides for the division of waters to be made upon the diurnal rather than the periodic flows may be met with the answer that the treaty does not specifically provide for the division upon diurnal flows and that, in any event, the working arrangements would, naturally, be turned over to the international joint commission to be created.

The assumption may, however, fairly be made that the division is to be based upon diurnal flows. And if so, it does not require any extended experience in irrigation affairs to with certainty that difficulty would be experienced and conflict arise. From the composition of the commission and the arrangement provided for in the event of an even division of that body, it may be predicted, with greater certainty, that such division of the waters on diurnal flows, would result in a period of inaction and delay.

I am strongly of the opinion that the division on diurnal flow would result to the benefit of the United States, as would inaction and delay, and certainly to the loss of Canada. And with such certainty apparent, it would seem to be prudent to give the joint commission definite instructions on that important feature at this stage of the proceedings.

And I am more convinced that such difficulty would arise because of the absence of all reference to the creation, by the United States, of storage reservoirs on the St. Mary river particularly, because of the assurance that the United States can avail itself of the provisions of this treaty without the construction of such a reservoir, which would be in my judgment, to the loss of Canada in availing itself of the waters of the stream, for the more beneficial use, and because of the absence of any reference to the division of the waters on periodic flows, which has heretofore been a vital consideration in all communications on the subject, especially in the communications from Secretary Root, June 15, 1907.

It is essential, for the most successful operation of what is ostensibly the purpose of the treaty as it relates to these two streams—the most beneficial utilization thereof by the High Contracting Parties, that the flows during the winter months, that is of November, December, January, February and March, be stored, and stored in the United States.

It is impossible, from the operative point of view in connection with irrigation—to carry these waters in open canals at these altitudes, during the winter season. That would result in accidents and great expense, and be without any real benefit.

These waters can be stored naturally and advantageously in the United States. On both streams, the United States contemplate, or contemplated, the erection of reservoirs in the bed of the stream, where all the available winter flow would be conserved, without damage to structure and without loss.

In Canada, there are no reservoirs so fortunately located; all of them would have to be fed by diversion canals from the rivers, which canals could not be oper-

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ated in the winter season. In Canada, storage means the conservation of the summer flood flows only.

The winter mean flows amount to, on the St. Mary, 100,643 acre feet, on the Milk river, 51,695 feet, together 152,338 acre feet out of a total of 500,597 acre feet to which either party,—the United States for instance, would be entitled during the whole year. That would leave 348,259 acre feet to be supplied out of both streams during the irrigation season, of which the mean flow of the Milk river would supply 64,215 as the share of the United States, leaving 284,044 acre feet to be secured from the St. Mary river in that period.

During that period, however, the St. Mary river affords normally 454,731 acre feet over and above the first right of Canada, under its prior appropriation, on the terms of the treaty of 500 cubic feet per second. And out of that surplus, the United States could secure, if it so desired, all of the water it was entitled to in the 'equal apportionment,' over and above what it secured from the Milk river.

That may be more plainly and effectively stated in another way. From the mean flow of the Milk river, the United States would be entitled to 115,910 acre feet in the twelve months, leaving 384,687 acre feet to be secured from the St. Mary river. That amount can be secured from that river by direct flow during the irrigation season, without requiring the construction of any reservoir at St. Mary lakes.

And, by such arrangement, Canada can be left to secure its share out of the summer and winter flow of the Milk river, and the summer and winter flow of the St. Mary river.

Ordinarily, there is no winter flow of the St. Mary river at the intake of the Canadian canal. Any flow recorded during that season appears at the boundary line or below—so that thereby Canada would be entitled to water it could not possibly secure, even if it could utilize.

It is a physical impossibility for Canada to conserve the winter flow of the St. Mary river, and consequently, there would be one-half of the winter flow of the Milk river, 25,847.5 acre feet, and all of the winter flow of the St. Mary river, 100,643 acre feet, together 126,490.5 feet—in excess of one-fourth of her total share in the 'equal apportionment'—which Canada could not possibly conserve, but which she may be compelled to accept as part of her share of this division, on the terms of the treaty.

Such arrangement would be referred to the commission. It is highly advantageous to the United States and greatly detrimental to Canada. There would probably be an 'even division' in the commission, the commissioners on each side would report to their own government, the High Contracting Parties would endeavour to agree upon an adjustment and, in the meantime, time and water would be lost.

To carry this method of operation out, the United States would require to enlarge the diversion canal from the St. Mary river to the Milk river above the capacity now proposed, 850 cubic feet per second, to at least 1,800 cubic feet, in order to secure the full benefit of the flood flows of the St. Mary river during the months of June and July. That, however, may be a less expensive operation than the construction of any reservoir at St. Mary lakes; or, it may continue to rely, solely, upon the present capacity of the diversion canal and construct a smaller reservoir at St. Mary lakes, with a capacity of about 150,000 acre feet, which, it will be recalled, has been engaging the attention of the engineers of the Reclamation Service.

It has to be remembered in this connection, what has probably not hitherto been made sufficiently and strikingly clear, that, in the Chain Lakes Reservoir, built directly on the bed of the Milk river, the United States would possess a basin of a capacity of 463,750 acre feet, which is only 36,853 acre feet less than its share of the 'equal apportionment' of the mean flows of the combined streams. That amount of 36,853 acre feet could be passed through it and delivered as a direct

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supply and leave Chain Lakes Reservoir capable of conserving the full share. And when it is recalled that the ultimate extent of the irrigable area on the Milk river is 200,000 acres, with a duty of water of 2 acre feet per acre or 400,000 acre feet in all, which the Chain Lakes Reservoir alone can abundantly conserve, this arrangement may be the economic solution of the problem as viewed by the United States.

In consideration of the compensation the United States would make, by the 'equal apportionment' provided in the treaty for the use of the channel of Milk river for the conveyance of any waters from St. Mary river, the strictly commercial aspect has been fully discussed in my report to Dr. King, April 22, 1906, pages 51 to 57, inclusive.

It is there pointed out that to divert such water, by any other route through the United States, would involve to that country an expenditure of from three to five million dollars, and it becomes, as expressed by the officials of the Reclamation Service, 'a critical question for the United States whether any economy of construction would justify giving up any considerable amount of water which might be used in future development of the arid lands.'

That, by itself, does not wholly cover the ground to be traversed by the provisions of the treaty; it omits consideration of the far more important feature 'of the more beneficial use to each country' of the waters of these streams, more fully expressed in the words 'an agreement whereby all available water shall be utilized for the conversion of the present desert wastes to the fertility of irrigated fields, to the advantage of both countries, is in the very highest degree desirable.'

On the narrowest lines, the consideration, in water values, that the United States should pay to Canada for a right of way through 215 miles of river channel in Canadian territory and for a now completed canal, as the Milk river is, and admitting, for the moment, that the United States has sovereign rights over the waters of streams which occur in its territory, is not difficult of ascertainment.

Canada's share of the waters of the St. Mary and Milk rivers under the provisions of the treaty are, as already stated,

From St. Mary river..	384,687	acre feet.
From Milk river..	115,910	"
Total..	500,597	"

The United States, however, would not 'give up' all of that as compensation for the use of the channel. The treaty admits the prior appropriation of Canada in the St. Mary river of 500 cubic feet per second during the irrigation season, and that amounts to 214,000 acre feet. While the treaty does not so admit, the United States must equally and consistently recognize the prior appropriation of the Canadian Canal on the Milk river, subsequent to the prior appropriation in the United States from that river, in the amount of 359 cubic feet per second. The Canadian canal capacity is 330 cubic feet per second. That amount represents in the four months of April, May, June and July, 80,520 acre feet, while the analysis of the normal flow of the Milk river, at page 27, shows that, recognizing the prior claim of 359 cubic feet per second, the Canadian canal could obtain 66,105 acre feet.

Together, these amounts are:—

From St. Mary river..	214,000	acre feet.
From Milk river....	66,105	"
Total..	280,105	"

which amount of water, even holding to sovereign rights, but, in its own interest admitting the necessity for irrigation in an arid region, the United States cannot deny to Canada, 'in strict conformity with the laws concerning the rights to the

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use of water as recognized by the courts of the arid region both on this side of the international boundary and the other.'

There would then remain 220,492 acre feet as the maximum amount of water which the United States would 'give up' for this privilege. It would be less than that, in my judgment. I am very decidedly of opinion that the Canadian prior appropriation on St. Mary river could not be limited to 500 cubic feet per second, in view of the fact that the canal has to-day a greater capacity than that and that capacity has been developed strictly in compliance with the provisions of the authorization and with the narrowest conception of the exercise of due diligence. Nor, strictly speaking, would any limitation of the appropriation be confined solely to the irrigation season' under the provisions of the authorization, which grants 500 cubic feet per second of the low flow. I have pointed out that it would not be physically possible to run that water or any considerable part, during the winter season, but the right to do so is not and cannot be denied to the Canadian canal, under the authorization.

For the purposes of valuation, however, the quantity of 220,492 acre feet may be assumed. What is that amount of water worth in cash?

At page 56, report to Dr. King, April 22, 1908, an analysis has been made of values from figures given in the Reclamation Service reports.

On the Lower Milk river project, the value of irrigated land is given as \$40 per acre, on a duty of 2 acre feet per acre per annum.

It is an axiom, in irrigated districts, that the value of the water, or water right, is one-half of the value of the irrigated land, consequently the water right of 2 acre feet per acre in the Lower Milk River valley is \$20, or 1 acre foot is worth \$10.

The total amount of water 'given up' to Canada is thus \$2,204,920.

That represents a saving to the United States, over the cost of construction of any other route of, at least, one million dollars.

The value in acre feet per acre reclaimable has already been fully considered, in which it is shown that the United States would receive $2\frac{1}{2}$ acre feet per acre per annum for every acre shown by the reports of the Reclamation Service to be reclaimable in that country, while Canada will practically have 0.8 acre feet per acre per annum for the area reclaimable in its territory; or, if the duty of water established by the Reclamation Service is the least that can be provided for successful cultivation, Canada must be prepared to abandon 380,000 acres to desert conditions for all time.

There are two features to be regarded, it seems to me, in future consideration of the situation.

There is the obligation of the Canadian government to its licensee, the Alberta Railway and Irrigation Company, in the event that, by the provisions of this treaty, its operations should be curtailed. On the St. Mary river, its authorization permits of its diversion to the extent of 2,000 second feet of the flood flows. The normal stream flow is sufficient to permit of the development of an irrigation system to the amount of the authorization, and it is probable that, within the period of the grant, the company can, if not interfered with, so develop their system, judging from the progress made up to the present time.

In the event of a diminution of the normal flow of the St. Mary river to provide for the requirements of the United States under the provision of this treaty, it is physically possible for the Canadian government to make good the loss to its licensee, to some extent, by the diversion of waters from other streams, as the Belly river, but at considerable outlay. But, in any event, Canada must reckon on the loss of available territory in proportion to the loss of water sustained and should, therefore, be guided by far-seeing consideration of the amount of water to be surrendered.

On the other hand, the United States may, if it so elect, stand upon the claim of sovereign right and thereby, whatever may be the legal merits of such a claim,

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be open to the charge of inconsistency in dealing with its northern and southern neighbours, Canada and Mexico, and still further be charged with the reversion of the accepted doctrine of the arid region,—that the use of the waters of the streams of these districts be conserved to the ultimate design of conferring the greatest benefits to the greatest area. With the area susceptible of irrigation in the United States limited, by the investigations and surveys of its own Reclamation Service, to an area of 200,000 acres and a duty of water similarly defined as 2 acre feet per acre, it is impossible to understand why the United States, on any ground, legal or otherwise, should require the provision of more than 400,000 acre feet, leaving the balance to Canada, where all of the normal flow of the combined streams can be applied to beneficial use 'to the conversion of the present desert wastes to the fertility of irrigated fields.'

It is entirely conceivable that Canada would be disposed to sacrifice much for the maintenance of harmonious relations with the United States, but so far as the disposition of the waters of these streams, which may be used for the extension of irrigation, is concerned, it surely ought to be on lines that, fully protecting the United States in all that it can legitimately claim and beneficially use, shall still preserve the heritage of the Canadian people, and that will certainly not be fully secured by the provisions of the treaty.

Paragraph 2 of Article 6 of the treaty provides that 'the channel of the Milk river in Canada may be used at the convenience of the United States for the conveyance, while passing through Canadian territory, of waters diverted from the St. Mary river. The provisions of Article 2 of the treaty shall apply to any injury resulting to property in Canada from the conveyance of such waters through the Milk river.'

The conveyance of waters diverted from the St. Mary river, through the channel of the Milk river in Canada, at the convenience of the United States, will present physical conditions which are not provided for in Article 2 of the treaty.

That Article 2 provides that each of the High Contracting Parties reserves the exclusive jurisdiction and control over the use and diversion 'of all waters on its own side of the line which in their natural channels would flow across the boundary or into boundary waters' and it is agreed 'that any interference with or diversion from their natural channel of such waters on either side of the boundary resulting in any injury on the other side of the boundary shall give rise to the same rights and entitle the injured parties to the same legal remedies as if such injury took place in the country where such diversion or interference occurs.'

That clearly means, in this particular case of irrigation streams, that, if the Canadian government permitted the diversion, for irrigation purposes, from the Milk river or any of its tributaries of any water naturally occurring in Canadian territory at a time when a prior appropriation in the Lower Milk River valley in the United States was not securing the full amount of his appropriation, the United States appropriator would be entitled to the same rights and the same legal remedies against the Canadian making the diversion as if that diversion were made in United States territory. That is to say, that the United States appropriator could ask the Canadian courts for injunctive relief and for damages for the actual injury by loss of crops or otherwise, against the Canadians making the diversion.

It may also be interpreted to mean that no diversion of any portion of the water conveyed by the United States from the St. Mary river, through the Milk river, would be permitted, as any such diversion, in any amount, would clearly be to the injury of the user of such water in United States territory. Although that prohibition is nowhere stated in the treaty, it is to be concluded that it is clearly understood between the High Contracting Parties, if for no other reason than the plain announcement of it in the communication from Elihu Root, Secretary of State, to

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the Governor General, of date June 15, 1907 (see page 79 of my report to Dr. King, of April, 22, 1908) at paragraph 8, reading as follows:—

That Canada shall, in no event, divert from the Milk river any portion of the stored St. Mary river water turned into the Milk river system by the United States, due allowance being made for losses by evaporation or seepage, while passing through the channels of the Milk river system as fixed by the Commission provided for in paragraph 14.

And, as an 'interference with,' in the sense of an addition to or increase of the natural flows of the Milk river, a stream crossing the boundary, the agreement in Article 2 may, by greatly amplified interpretation, provide for legal redress of any injury, within the Canadian borders, resulting from the conveyance of such stored waters at the convenience of the United States.

It must be very plain, however, that the injury caused by such would be of a special character and entirely different from those considered and provided for in Article 2 as it now stands, which is peculiarly injury that would result from diversion, or from interference, as by the construction of remedial works. And as the nature of such injury can readily be forecast, it would certainly seem wise to make ample provision, at this time, for its possible avoidance, or for redress, repair and compensation.

The injury involved in the conveyance of such stored water, in addition to the natural flow of the Milk river, will be of two characters—possible injury to existing structures and certain erosion of the stream bed.

Of existing structures, there are now the dam at the intake of the Canadian canal and the railroad bridge crossing of the Alberta Railway and Irrigation Company. There are not at present any highway bridges, as the stream is fordable for the greater part of the year, except, ordinarily, during the period from May to July, inclusive, and only in that period at the height of floods. But, with the continuous flow during the summer season of the volume of water contemplated by the United States, the erection of highway bridges along the channel will become inevitable, otherwise that portion of Canada lying south of the Milk river may as well be ceded to the United States, and the boundary line changed to occupy the centre of the channel of Milk river.

These features of the burden imposed upon Canada by conveyance of water at the convenience of the United States were fully considered by me in my report to Dr. King, April 22, 1908, pages 30 to 33, and beyond the suggestion that the comments there made, and the full report of Mr. Fontaine, be read and carefully weighed there is no occasion to make further detail at this time.

It should be emphasized, however, that the continuous flow for a lengthened period of even a moderate volume of water, to say nothing of the quantity contemplated by the United States (850 cubic feet per second is the capacity of the diversion canal now under construction), which is in excess of the mean flow of the Milk river in any month of the year (see page 63, report of April 22, 1908, and page 55 this report), will much more surely and speedily create erosion, even on the lower gradients of the stream, than great volumes for short periods.

And the practical result of this conveyance of water through the Milk river by the United States will be to convert the channel into an irrigation canal. If an irrigation company were to construct a canal of similar dimensions for 200 miles in Canadian territory, it would be compelled under the Irrigation Act to erect and maintain highway bridges over road allowances for the use and convenience of the settlers. If this burden is not imposed upon the United States, it will have to be borne by the Canadian government, unless, as I have pointed out, Canada is prepared to leave the portion of its territory south of the Milk river unsettled, or, if settled, with its trade tributary to the United States.

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I believe it is fair to say that the United States realizes the extent and character of the burden involved in the erection and maintenance of highway bridges, and the injury likely to follow from erosion and seeks to avoid it by the indefinite reference of such to the provisions of Article 2. That is clearly revealed, it seems to me, in paragraph 13 of the communication from Secretary Root, June 15, 1907, which reads as follows:—

That the United States shall not be liable for damages of any kind resulting from high water stages or floods of Milk river, whether occurring at times when water from St. Mary river is being carried in Milk river or not.

With the certainty of such damage occurring, and the necessity for special provisions so manifest, it would clearly be prudent for Canada now to make specific arrangement for it, even granting, what is not plain to the lay mind, that article 2 fully covers it, in terms generally as follows:—

The United States shall be liable for the cost and maintenance of all structures rendered necessary in the bed of Milk river within Canadian territory, used by the United States in the conveyance of water, to maintain and protect the vested rights of the Canadian government or of settlers in the Milk river valley and for any and all damage to existing structures on Milk river in Canadian territory whether these are owned or controlled by the Canadian government or by private parties. And the United States shall further be liable for the cost and maintenance of highway bridges over the Milk river, within Canadian territory, not exceeding 30 in number, the selection of the sites of said bridges to be made by the International Joint Commission in consultation with the duly appointed provincial officers.

The provision of an International Joint Commission, consisting of an equal number of members representing each of the High Contracting Parties and without an oversman, whose judgment would be called in case of an even division in the body, is an unusual commission in such important matters. On all of the other controversies sought to be adjusted by the treaty, it may result satisfactorily, even with the delays that would likely occur in the presentation of reports by each set of commissioners to their respective governments. In the case of dispute over the apportionment, for irrigation, of the waters of the St. Mary and Milk rivers, where prompt action might be required in order to conserve these waters to the fullest benefit, such delay might, it seems to me, result in serious loss to either and perhaps both countries.

I have already pointed out the lack of instructions to guide the International Joint Commission, on the feature alone of the diurnal or periodic apportionment of these waters, the importance of which may, probably, be readily apparent only to those who have extended experience in the regulation and distribution of waters for irrigation purposes. As the treaty stands, there is ample room for wide divergence of opinion on that feature, and recognizing that probability, it would certainly seem advisable to make definite provision, within the treaty itself, of the method which shall be adopted and followed. I am convinced that it will be greatly to Canada's loss, if any other than the method of periodic apportionment is followed, but, in any event, it should now be declared, for the guidance of the Commission, just what method is agreed upon.

The necessity for the appointment of an oversman seems equally plain, although if the periodic method of apportionment is established there would be less apparent need for his service, at least immediately.

There should also be, in my judgment, a provision for damages in the event of failure of any reservoir dam or other works, in something of the following terms:—

Either country shall be liable to the other, or any citizen thereof, for any and all injury or damage created by failure of any artificial structures built by

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them within their own territory, but in connection with the development of this enterprise of combining the waters of the St. Mary and Milk rivers, or for any and all damage caused by either country in diverting water from either stream into the other.

In the event failure of the embankment of the proposed St. Mary reservoir, great injury might be done to settlers along the river bottoms in Canada, for which recovery could not be made unless some such method is provided for.

And it certainly seems to me that the provisions of the treaty, as it is now drafted, should be accompanied—

With the further understanding that the failure of either country to fully utilize the rights hereby agreed to shall not be regarded as adding to or diminishing the rights of the other country, but either country shall be entitled to avail itself of any water not utilized by the other country under this agreement.

It is very certain that occasions will arise when either country will not be able to avail itself of the provisions of the treaty in respect to the amount of water utilized, and it is only just that, on such occasions, the other country should be permitted to avail itself of the unutilized quantity of water, if it so desires, and that without affecting its rights under the treaty.

It may be suggested that such additional provisions as herein outlined are more properly the province of the International Joint Commission and the regulations they may establish, but it would clearly avoid the possibility of disagreement if the principles on which the treaty is based could be defined to the commission without unduly burdening the treaty itself.

And it may be pointed out that the provision suggested was incorporated in the communication of Secretary Root to the Governor General, June 15, 1907, as Article 3. (See report to Dr. King, April 22, 1908, page 77).

Thus far this review and report has been confined to criticism of the treaty as it is now drawn, and its effect upon Canadian interests.

With a desire to avoid the appearance of being entirely iconoclastic, and at the same time the appearance of presuming overmuch on the instructions given to me, I would venture to suggest an alternative proposition which would safeguard the interests of the United States, and, at the same time, give an opportunity to Canada to extend the development of the irrigable territory in Southern Alberta.

In more than one place in this report (as at pages 35 and 41), it has been pointed out that the United States, by the extensive and elaborate surveys conducted by its reclamation service, had determined the limit of the irrigable area in the Lower Milk River valley in Montana at approximately 200,000 acres. It has also declared, by the same service, that the necessary duty of water in that region is two acre feet per acre per annum, while the scientific observation has been that the actual duty has been less than that—has been 18 inches or $1\frac{1}{2}$ acre feet per acre per annum.

On the higher duty, there would be a total requirement of 400,000 acre feet per annum. On the principle that the underlying object of this treaty, so far as it affects the waters of these international streams, the St. Mary and Milk rivers, is, in the words of the treaty itself, 'to afford a more beneficial use to each,' the United States cannot reasonably require more.

On the other hand, with 630,000 acres of land available for reclamation by irrigation, Canada can make a beneficial use of all the water obtainable over and above 400,000 acre feet per annum.

It would, therefore, appear that the whole purpose and object of the treaty can be subserved by the undertaking of Canada to deliver, annually, to the United States, at the most easterly crossing of the international boundary of the Milk river, out of the waters of the two streams, 400,000 acre feet of water. The United States can make its own provisions for the conveyance and storage of such amount of water, it

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may build reservoirs on the St. Mary and Milk rivers, either or both, and make such diversion channels as would seem to the reclamation service best and most economically fitted for that purpose, on the understanding, however, that the United States would take the winter flow of both streams. And, without presuming to give advice to the engineers of the service, I am well convinced, from my personal knowledge of the situation, that out of the consideration of such a proposal, they can evolve an entirely adequate and much less expensive method of reclaiming these lands in the Lower Milk River valley.

But, in such arrangement, Canada should still retain the provisions for maintenance of existing structures and highway bridges on the Milk River in her own territory, and also that either country may avail itself of any waters not utilized by the other country.

Before concluding this report, I would draw attention to the remarks made by me, in report to Dr. King, April 22, 1908, pages 68 to 70, on the alternative route for a diversion canal from St. Mary river to the headwaters of the Milk river.

I am satisfied that the engineers of the United States are of opinion that this route is much more economical than the all-American route surveyed, and that it possesses more decided advantages than even the brief reference quoted from the fourth annual report would indicate.

And, for the ultimate development of the possible irrigation works in southern Alberta, it would be highly advantageous for Canada, by its government or licensees under it, to have the right of entry for construction in United States territory. As I pointed out in the previous report, that object can be accomplished by a canal route wholly within Canadian territory, but at much greater expense, and by the construction of a high impounding dam on the St. Mary river, which would back water up into the United States territory.

There would seem to be no good reason to expect objection from the United States authorities to grant right of way for such a canal, in the event of its proposal, under ordinary conditions, but as the object of the treaty is to dispose of all matters affecting these rivers at this time, it would seem prudent to make arrangement for this feature now.

Finally, in summary, I believe I have referred to all the possible features that should be considered in connection with this treaty, and would hope that I have presented them in such a manner that Canada, with a great desire to maintain harmonious relations with the United States and co-operate with that country in the greatest possible development of the waters of the St. Mary and Milk rivers for the irrigation of the arid sections in both countries, may fully protect the present and future interests of her own people in Southern Alberta, where so much development is possible—so much more than is readily appreciable.

Respectfully submitted by

GEORGE G. ANDERSON,

*Consulting Engineer, Mem. Inst. C.E., Mem. Canadian Soc. C.E.,
Mem. American Soc. C.E.*

TABLE A.—Discharge of St. Mary River, Near Cardston, Alberta, 1902-1908.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1902.	.....	.....	.....	.....	.....	.....	.....	.....	35,940	29,330	29,350	67,114	
1903.	<i>a</i> 52,572	<i>a</i> 50,70	<i>a</i> 78,028	63,550	105,759	309,421	179,790	86,329	65,990	56,384	31,835	25,931	1,107,294
1904.	<i>a</i> 13,773	<i>b</i> 11,504	<i>b</i> 12,298	<i>b</i> 55,63	124,328	166,255	114,367	57,245	24,992	13,097	<i>b</i> 7,200	<i>b</i> 9,654	619,409
1905.	<i>a</i> 5,334	<i>a</i> 4,165	<i>b</i> 10,510	17,550	74,710	146,500	101,000	52,080	22,080	47,170	17,730	<i>a</i> 14,760	514,100
1906.	<i>a</i> 6,150	<i>a</i> 5,280	7,690	28,600	92,200	136,000	113,000	58,200	57,400	46,500	65,500	22,100	619,000
1907.	<i>a</i> 9,220	<i>a</i> 11,100	<i>a</i> 9,220	29,100	119,000	253,000	192,000	81,800	72,000	34,900	14,500	9,650	835,400
1908.	<i>b</i> 3,070	<i>b</i> 5,750	13,800	50,200	153,000	380,000	156,000	51,200	26,800	29,100	27,300	7,690	903,910
Mean in ac. ft.	15,053	14,751	21,924	40,773	111,500	231,863	142,693	64,476	40,743	36,383	26,354	22,561	769,374
Mean in sec. ft.	242.8	263.4	353.6	679.5	1,798.4	3,864.4	2,301.5	1,039.9	679.0	591.7	439.2	363.9	

a—Approximated.
b—Estimated from gauge heights.

TABLE B.—Discharge of Milk River, at Havre, Montana, 1898–1908.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1898.					85,837	80,568	10,330	6,948	3,154	5,411 <i>c</i>	5,950	6,948	...
1899.	26,440 <i>a</i>	33,322 <i>a</i>	30,744	81,223	61,857 <i>a</i>	55,934 <i>a</i>	14,818 <i>a</i>	12,052	7,795	57,798 <i>a</i>	11,306 <i>a</i>	9,223	402,512
1900.	6,149 <i>a</i>	5,554 <i>a</i>	9,223 <i>b</i>	23,445	26,747	9,164	2,644	2,460	4,522	11,437 <i>c</i>	6,783 <i>a</i>	3,074	111,202
1901.	3,074 <i>a</i>	5,554 <i>a</i>	36,893	12,198	39,844	32,906	11,314	1,722	3,332	5,012	4,760 <i>a</i>	6,149	162,788
1902.	11,068 <i>a</i>	11,552	15,310	11,663	66,714	88,007	125,742	23,181	17,673	18,999 <i>a</i>	17,851 <i>a</i>	18,466	426,226
1903.	12,298 <i>g</i>	11,107 <i>g</i>	14,757	59,266	66,344	58,015	27,362	23,242	9,759	8,485 <i>g</i>	6,843 <i>g</i>	9,038	306,516
1904.	5,534 <i>a</i>	4,314 <i>a</i>	4,612	103,299	22,935	16,542	2,705	307	178	1,168	2,083 <i>a</i>	1,537	165,214
1905.	307 <i>a</i>	278 <i>a</i>	2,460	3,511	3,812	2,083	3,320	1,290	...	...	...	...	...
1906.	...	...	1,200	5,630	7,320	55,000	6,210	320	167	92 <i>f</i>	30	...	...
1907.	...	44,460	52,000	72,600	28,200	48,900	24,400	3,790	7,560	5,030	4,310	3,690	294,280
1908.	...	...	13,000	17,600	20,300	123,000	32,400	10,900	7,380	10,900	11,100	...	246,580
Mean in acre ft.	7,208	12,898	18,029	38,983	39,083.	51,884	23,750	7,837	6,152	12,436	7,102	6,458	231,820
Mean in sec. ft.	116 3	230 3	290 8	649 7	630 4	864 7	383 1	126 4	102 5	200 6	118 4	104 2	...

a—Approximated.
b—Estimated from gauge heights April 10–30, 1900.
c—Estimated from gauge heights November 1–15, 1900.
d—Estimated from gauge heights May 15–31, 1898.
e—Estimated from gauge heights November 1–19, 1898.
f—No flow after November 16.
g—Estimated.

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TABLE C.—Table showing mean flow of Milk River and amounts available for Canada, on basis of prior appropriations in United States at 359 and 500 cubic feet per second.

—	Mean flow.	United States prior rights.	Available for Canada.		United States prior rights.	Available for Canada.	
	sec. ft.	sec. ft.	sec. ft.	acre. ft.	sec. ft.	sec. ft.	acre. ft.
January. . . .	116·3	..	..	..	..	..	..
February	230·3	..	..	..	..	..	..
March.	290·8	..	..	..	..	..	..
April.	649·7	359·0	290·7	17,442·0	500·0	149·7	8,982·0
May	630·4	359·0	271·4	16,826·8	500·0	130·4	8,084·8
June.	864·7	359·0	505·7	30,342·0	500·0	364·7	21,882·0
July.	383·1	359·0	24·1	1,494·2	500·0	..	..
August	126·4	..	..	..	..	..	..
September. . . .	102·5	..	..	..	..	..	..
October.	200·6	..	..	..	..	..	..
November	118·4	..	..	..	..	..	..
December	104·2	..	..	..	..	..	..
Total.			66,105·0		Total. 38,948·8		

APPENDIX A.

Condensed Statement taken from the Report on the St. Mary Canal Project.

STORAGE AND DIVERSION OF THE WATERS OF ST. MARY LAKES, MONTANA.

The St. Mary project is designed to store flood waters in the St. Mary lakes in Northern Montana and conduct these easterly by a canal cut through the ridges at the head of Milk river. These lakes receive the drainage from the high peaks of the Rocky mountains, but, instead of continuing easterly across the plains as do the rivers further south, the water overflows northerly by St. Mary river to the Saskatchewan river and are lost in Hudson bay. The easterly course, which appears to be the original or natural direction for the waters to pursue, has been blocked by the glacial debris left near the foot of the mountains. In this low, irregular country are a number of small streams, most of which are tributary to Milk river. The proposed canal will restore what may be called the pre-glacial drainage and allow the waters from the Rocky mountains to continue eastward down the slope of the country.

Milk river, heading in the low, rolling country, east of the foot of the mountains, has a general northeasterly direction, the two principal branches, north fork and south fork, uniting after crossing the Canadian line. The stream thus formed flows easterly for 150 miles or more, where it bends to the southward and again returns to Montana, finally emptying into the Missouri river. The broad Milk river valley in Montana consists of a generally rolling country, adapted to irrigation.

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The water supply from the river is, however, deficient, owing to the lack of high mountain area at the headwaters. The diversion canal, as planned, will restore the mountain catchment area to this stream.

It is proposed to build a low storage dam at a point about three-fourths of a mile below the present outlet of lower St. Mary lake. This dam will have a maximum elevation of 50 feet above the bottom of the river and will form a reservoir of a capacity of 250,000 acre feet. This reservoir will serve to hold the flood waters and the supply received from the melting snow in the mountains. The head of the diversion canal will be on the right hand or eastern side of the dam. It will continue down along the right bank of the river for about seven miles, then turn easterly through a low gap.

The water of the St. Mary river is not used in the United States, but in Canadian territory, seven miles north of the international line is a canal completed in 1900. Between the site of the proposed dam at the foot of St. Mary lake and the head of the Canadian canal a considerable number of large streams discharge into St. Mary river, furnishing an ample supply for the land irrigated in Canada. It is not believed that any international complications can arise concerning water rights, since the water which it is proposed to store and divert occurs wholly within Montana and it would be impossible for the Canadians to store and utilize this flood water, even if needed in their canal.

The length of the proposed St. Mary canal, from its head on St. Mary river to the north fork of Milk river, is 27.4 miles, and the cost of construction, including dam and headgates and the drop at the north fork, will be \$687,000.

Estimated Cost of St. Mary Dam and Canal to North Fork of Milk River.

Dam..	\$22,000
Tunnel at head..	12,000
Headgates..	10,000
Head to Spider Lake excavation..	245,100
Spider Lake to drop, North Fork excavation..	288,400
Drop, North Fork..	16,040
Two sets of waste gates on line..	4,000
	<hr/>
	\$597,540
Engineering and contingencies..	89,460
	<hr/>
Total..	\$687,000

The canal has been planned to carry 1,200 cubic feet per second, and the amount of acreage to be reclaimed is estimated at 120,000 acres of public land, which would have a probable value of \$35 per acre, or \$4,200,000, and would sustain a population of 20,000. By storage in the Lower Milk River valley the area of reclaimed land, including the use of Milk River, can be increased to 300,000 acres.

The extension of the canal from North Fork to South Fork and turning it into this latter stream will have certain advantages over the plan for stopping the canal at the North Fork. The total cost of the canal, from the head to the South Fork of Milk river, will be \$1,173,000, and its length will be 43.3 miles.

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Estimated Cost of St. Mary Dam and Canal to South Fork of Milk River.

Dam..	22,000
Tunnel	12,000
Heagates.. . . .	10,000
Head of Spider Lake.. . . .	245,100
Spider Lake to North Fork of Milk River.. . . .	288,400
Two sets of waste gates.. . . .	4,000
Siphon, North Fork.. . . .	67,000
North Fork to South Fork Milk River.. . . .	360,800
	<hr/>
	\$1,009,300
Contingencies.. . . .	109,000
Engineering.. . . .	54,700
	<hr/>
Total.. . . .	\$1,173,000

If the water is turned into either the North or South Fork of Milk River, it first finds its way into Canada before it can be used in the lower basin. The valley proper of Milk River in Canada is comparatively narrow, and has little irrigable land, so that any proposition on a large scale must contemplate using the high bench of lands above.

Milk river in Canada, from the junction of the north and south forks down stream, has a very slight fall—not more than two feet to the mile—and a canal of 100 miles or more in length would be necessary before the water could be brought to the upper benches. It is not, therefore, considered feasible to divert the waters from Milk river in Canada. In case this should ever be attempted it is entirely practicable to keep the water in American territory by an extension of the canal from the south fork to the Marias river. The canal from the south fork could be carried around the ridge between the basin of this stream and that of the Marias drainage, and, after running for a distance of about 46 miles from south fork, it could be turned into Cutbank creek. The cost of construction from the head to this point will approximate \$1,623,000 and the distance will be 90 miles. The canal has not yet been located from the south fork to Cutbank creek, and the latter figure of cost is a rough estimate. The water could then be allowed to continue down the natural channel of this stream and the Marias for 100 miles or more, when it could be diverted from the latter near the mouth of Willow creek, and in the course of about 75 miles turned into Big Sandy creek, a tributary of lower Milk river. This plan keeps the canal in United States territory for its entire course until it reaches lower Milk river, where the water can be most advantageously used. The total cost from the head on St. Mary river to Big Sandy creek, by the Marias diversion, is placed at \$2,600,000. This location has not been surveyed, however, and the above estimate, together with those that follow, are simply roughly approximate.

Plans have also been considered for a secondary system of storage reservoirs in the lower Milk river basin.

If this plan is adopted of turning the water of St. Mary lake into the south fork of Milk river, allowing it to continue down through Canada, and then utilizing it through the secondary storage system in lower Milk river valley, 300,000 acres can be reclaimed at an estimated cost of from \$7 to \$9 per acre.

In the complete development of the system, including the utilization of St. Mary and Marias waters and the construction of the secondary storage system, about 500,000 acres can be reclaimed at a cost not to exceed \$10 per acre.

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OTTAWA, Ont., April 22, 1903

W. F. KING, Esq., LL.D.,

Chief Astronomer, Department of the Interior,
Ottawa.

DEAR SIR,—I have the honour to submit herewith my report on the various features involved in a proposed agreement between Canada and the United States for the equitable division and use of waters of the St. Mary and Milk rivers in Alberta, Saskatchewan and Montana.

Respectfully submitted,

GEORGE G. ANDERSON,

Consulting Engineer.

REPORT ON THE PROPOSED AGREEMENT BETWEEN CANADA AND
THE UNITED STATES FOR THE EQUITABLE DIVISION AND USE
OF WATERS OF THE ST. MARY AND MILK RIVERS IN ALBERTA,
SASKATCHEWAN AND MONTANA.

In the matter of the equitable division and use of the waters of the St. Mary and Milk rivers between the United States and Canada, it would appear to be essential, at the outset, to form an adequate conception of the possibilities of the territory in Canada that will be affected by any arrangements made between the countries.

Solely from perusal of the various reports of the United States reclamation service, it would be concluded that the scope of irrigation possibilities in Canada from the St. Mary river are of the most limited character, that the plans which have been formed and the present constructed canals are merely of a trifling character, and it would almost appear from the numerous fretful remarks in various reports, to have been designed simply for the purpose of annoying the United States and interfering with the gigantic plans formed in that territory for the reclamation of vast areas upon the most philanthropic and altruistic ideas.

On the Milk river, Canada would appear to have engaged in an undertaking which the superior minds of the reclamation service officials early declared to be impossible of accomplishment by reason of physical difficulties, and later, to be regarded as the outward manifestation of an unfriendly act, contemplating the disregard of existing prior appropriations in the Lower Milk River valley, forgetful of the fact that, up to that time, such an action was precisely what the United States has proposed to do on the St. Mary river to Canadian appropriators.

It is not surprising, of course, that the United States should fail to form the least conception of the plans of Canada in regard to the reclamation of the vast territory in Alberta, though it may be difficult to understand why its officials should persistently ignore, even up to the present time, the possibility of storage development within the Canadian border.

But it is doubtful, on the other hand, if the possibilities within Canadian territory are fully or sufficiently realized by Canada itself and, before entering upon any negotiations looking to a final determination and adjustment of the available water supply of the two rivers that form the source of its future development, it is necessary to outline briefly but clearly what it is possible to accomplish.

The Alberta Railway and Irrigation Company operates from the St. Mary River under authorization of date May 3, 1899, granting it 500 second feet of the low flow and 2,000 second feet of the high or flood flow of the stream, with ten years in which to complete its works, which was subsequently extended to fifteen years, from the 23rd of October, 1902.

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From the Milk River the company operates under authorization of date October 23, 1902, granting it 500 second feet of the low flow and 1,500 second feet of the high or flood flow, with fifteen years in which to complete its works.

And further power is granted the company in connection with any streams from which water can be obtained to develop and reclaim the arid regions within the scope of its enterprise.

Surveys were projected which developed the fact that tributary to the canal system projected from the St. Mary River there were 450,000 acres capable of irrigation and under the system from Milk River, 180,000 acres.

With full realization of the fact that the direct flow of the streams, either separately or collectively, was not sufficient for the irrigation of that extensive area, explorations were conducted for the purpose of ascertaining and locating available reservoir sites, with the result that an extensive system was found, capable of serving the area irrigable, and these reservoirs and capacities, nearly all of them the results of careful contour surveys, are hereby given.

Connected with the St. Mary System.

	Acre ft.	Acre ft.
Mary lake reservoir..	21,658	
Taylorville reservoir..	42,836	
Lumpy Butte reservoir..	12,473	
Chin Coulee reservoir..	50,000	
	—————	126,967

Connected with the Milk River System.

Shanks lake reservoir..	109,347	
Milk river reservoir..	29,000	
Brunton reservoir..	67,000	
Raymond..	7,575	
Verdigris reservoir..	150,000	
Crow Indian..	100,000	
	—————	462,922

Total capacity..	589,889
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While filled from the Milk river, or from the St. Mary river, the waters stored in the Milk river reservoir and the Raymond reservoir would be utilized in the St. Mary canal system, and the waters stored in the Shanks lake reservoir could be used either in the Milk river canal system, or, by diversion, through the Milk river and Raymond reservoirs in the St. Mary canal system.

In addition to these reservoirs, there are other sites throughout the district under consideration, as Enokimi lake and Horsefly lake, that could be incorporated in the system, but whose capacities and general features have not been fully examined.

The whole project in combination forms an enterprise of unusual possibilities, of great scope and of certain returns, in a financial sense, as well as in the broader sense of opening up, developing and reclaiming, for the benefit of the coming generation, of an extensive area of what is at present an unsettled desert. It is as large and as feasible an irrigation enterprise as any in the arid regions of America.

And with considerable familiarity with such enterprises in the arid west, I can assert that the work of construction, of diversion of water and its application to beneficial use, and the settlement and reclamation of the lands tributary to the canal system of the Alberta Railway and Irrigation Company have been prosecuted with greater diligence and at a greater rate of progress in the increasase of population and all that involves than under any project of similar magnitude in an irrigation country. The compnay has, thereby, kept absolutely good faith with the Government,

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and by that very circumstance the possibility of the remaining section still unsettled and unreclaimed is as well known, if not better known, in the circles from which settlers are attracted to these new territories than any other similar section.

From all these considerations, it must be realized and fully borne in mind that Canada has as great and extensive a territory available for reclamation, dependent on the waters of the St. Mary and Milk rivers, as is contained within the territory of the United States.

And, by prior appropriation, if from no other circumstance, Canada has as clear a legal claim upon the waters of these streams as has the United States, whose only title to the water of St. Mary River, at the present time, in my judgment and, apparently in the opinion of the Reclamation Service officials, if the statements in their reports may be valued, lies solely in some shadowy claim that the waters which occur within United States territory are the heritage of the American people.

At the very outset, also, it has to be fully borne in mind by the representatives of Canada, that the proposed diversion of water from the St. Mary River by the United States is not, by itself, an enterprise that would be favourably considered in a commercial sense. That can be demonstrated by a careful and painstaking perusal of the various reports made upon it by the Reclamation Service from 1899, when it was first considered, to the present time.

The earliest proposition was to construct an all American route, skirting the head waters of the North and South forks of Milk River—across Rocky Coulee and along the southern slopes of the Sweet Grass hills, at a roughly estimated cost of nearly five million dollars.

It was proposed, then, to use the channel of Milk River in Canada, upon the assumption and assertion that Canada could not divert water from Milk River within its own territory and upon the actual demonstration that Canada could so divert water, the United States fell back upon a proposal to conduct the waters via the Marias route.

Abandoning all hope of forcing a way through the Milk River, the present status is, upon first blush, to secure an entry along that channel *upon terms*.

In the event that such terms as Canada requires may not be acceptable, it is proper to take some cognizance of the alternative routes and plans contemplated by the United States, in order that Canada may be well advised lest, in some extreme event, the United States should accomplish the diversion of water from the St. Mary River adverse to the interests of Canadian settlers and Canadian territory.

From the earliest consideration of the diversion of water from the St. Mary River by the United States officials, an alternative plan of utilizing the waters so diverted for the irrigation of lands in the eastern portion of the Blackfoot Indian Reservation and immediately adjacent thereto has always been suggested.

In the First Annual Report of the Reclamation Service, June-December, 1902, it is stated, page 206, that three courses were open for consideration: 'Second, utilize the water on lands as far west as possible, thus irrigating the eastern section of the Blackfoot Indian Reservation and lands immediately on the east.'

This reference is reported in somewhat similar form in the second, third, fourth and fifth reports and in the sixth and last report for 1906-1907, it is stated (page 115) that 'if such an agreement (with Canada for the equitable division and use of waters of both streams in either country) can not be reached, however, the second plan for the development of the St. Mary water will be carried out: that is, to utilize it on lands in the eastern part of the Blackfoot Indian Reservation and on lands immediately adjacent to the east.'

'The total area in this vicinity available for irrigation purposes is 100,000 acres.'

It may be well to give some consideration to the possibility of the plan being carried out, and the effect of such development upon Canada's interest in the waters of the St. Mary River.

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In page 180 of the Fourth Annual Report of the Reclamation Service for 1904-5 there is a map showing the relative position of this section of the Blackfeet Indian Reservation, and at page 179 is the following brief description of the extension of the canal from St. Mary river necessary to accomplish this development.

‘St. Mary canal would have to be extended first across the north fork of Milk river, then to and across the south fork to the top of the ridge, or the divide between south fork of the Milk river and the Rocky Coulee drainage, a tributary of the Marias. The total length of this canal would be 60 miles. The water would be turned into Little Rocky Coulee, down which natural channel it would flow for a few miles and then be diverted to the agricultural lands.’

Beyond the South Fork of Milk river there would then be about 17 miles of main canal to build—the South Fork being 43.8 miles from St. Mary river.

In order to form some conception of the cost of this canal system, reliance must be had upon the figures and estimates of the Reclamation Service as published in its various reports.

In the first place it is found that there has been already an expenditure of \$184,080.28 on this project, of which \$36,423.43 has been actually for excavating, leaving \$147,656.85 for engineering administration and contingencies.

In the various reports the estimated cost of the dams at St. Mary lakes is stated at \$250,000.00, which appears low enough when it is borne in mind that the total content of the dam will be 585,864 cubic yards (see page 208, First Annual Report) and that the surroundings for bed rock show in some places 188 feet depth.

On the first 14 miles, the lowest and only bid (rejected) was for \$767,505.00 and as the work is being done by force account, it may reasonably be concluded that the actual cost of construction will be at least that amount.

The remaining 13.4 miles to the North Fork of Milk river may be placed at the same amount though the work on this section is heavier than on the first 14 miles.

For the section between the North and South forks of Milk river 16.4 miles long, reliance must be had on the original estimate of the reclamation service (page 211, First Annual Report).

There is, first, a siphon crossing North Fork placed at \$67,000 for a structure of 2,636 feet long, with an invert of 161 feet, of three wooden stave pipes each 7 feet in diameter. The figure certainly appears very low.

The canal construction of 16.4 miles is estimated at \$360,000 in comparison with \$767,505 for 14 miles, while at page 211, First Annual Report, it is stated that ‘7 miles beyond the North Fork, the canal would pass through what is known as McLeod Gap, where occurs the greatest depth of excavation of the entire line, amounting to 176 feet.’

The first 20 miles beyond Fork (South) are estimated (page 212, First Annual Report) at \$12,000 per mile and there would be 17 miles at a total cost of \$204,000. Summarizing there would be:—

Engineering administration and construction to date..	\$147,656 85
Dam at St. Mary lakes..	250,000 00
First 14 miles..	767,505 00
Second 13.4 miles to North Fork, Milk river..	767,505 00
North Fork to South Fork, Milk river—	
Siphon..	\$ 67,000 00
Excavation..	360,800 00
	<hr/>
	427,800 00
17 miles beyond South Fork at \$12,000 per mile	204,000 00
Engineering and contingencies, 15 per cent on all save	
first item..	362,521 50
	<hr/>
	\$2,926,988 35

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to which must be added the cost of construction of distributing canals covering the irrigable area after the water has been diverted from Little Rocky Coulee, and that with the inevitable increase above several of the items enumerated above, for the very apparent reason suggested, would swell the cost to between $3\frac{1}{2}$ and 4 millions of dollars for the reclamation of 100,000 acres or between \$35 to \$40 per acre, which unit price may well cause the Reclamation Service officials to hesitate—it is certainly beyond the limit they have elsewhere applied to projects under their consideration.

If the reclamation of the Blackfoot Indian reservation and adjoining lands was to be considered as an independent project there would possibly be some amendments in the dimensions and estimates submitted.

It is estimated that there was 100,000 acres available for irrigation and that area would require on the duty of 100 acres to the cubic foot per second a canal capacity of at least 1,000 cubic feet per second, while the section of the canal upon which bids were submitted has a capacity of 850 cubic feet per second. On the other hand, the section of the canal upon which estimates of cost were given only, from the earlier reports of the Reclamation Service was designed to have a capacity of 1,350 cubic feet per second, and at first glance, it might appear that these estimates were subject to some reduction, proportionate to the reduction of the capacity from 1,350 to 1,000 or 850 cubic feet per second. As it has been shown, however, that the actual bids for the construction of the 850 second foot canal were in excess of the estimated cost of construction of the 1,350 second foot canal, it would seem that these estimates should really be increased and not decreased.

If the project is confined to the reclamation of the Blackfoot Indian reservation and adjacent lands there would not appear to be any necessity for the construction of a reservoir, or at least of a reservoir with capacities of either 250,000 or 150,000 acre feet at St. Mary lakes, and the estimated cost of construction of that feature may be eliminated from or materially decreased in the total estimate. That, of course may be done without seriously affecting the result as it is only \$250,000 out of $3\frac{1}{2}$ to 4 millions of dollars.

With 100,000 acres only to irrigate the United States officials might conclude to rely solely upon the direct flow of the St. Mary river, and Swift Current creek which would be diverted into the main stream above the point of intake of the diversion canal. To that, if necessary, could be added the waters of Kennedy creek, that is to say, it is a physical possibility to divert these also into the main stream above the point of intake of the diversion canal.

The irrigation season ordinarily embraces the months from April to October, inclusive, though, of course, full supply is not required throughout all of that period. From the records of the stream flow from 1902 to 1906, inclusive, at the international line, the following are the mean flows during these months, in second feet.

April..	688.9
May..	1,600.8
June..	3,159.0
July..	2,029.0
August..	1,023.5
September	621.3
October..	621.9

From that table, it will be seen that the United States could depend on the full supply of 1,000 cubic feet per second for the direct flow of the river in all the months of the irrigation season, except April, September and October.

During these months, a full supply would not be required, indeed it is doubtful if any water at all would be used or could be diverted ordinarily in April. The Alberta Railway and Irrigation Company rarely run water in their canal prior to May

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1st. If full supply for September and October were required, the construction of a reservoir of smaller capacity than 250,000 or 150,000 acre feet would fully answer the requirements at a reduced cost.

Dependence upon the direct supply leads to the consideration of the attitude of the United States to the rights of prior appropriators of water from the stream in Canada and that should be discussed in connection with the general features of this alternative plan in its bearing on the water supply. In the event, the remote event, it may reasonably be described, of the United States proceeding with the enterprise of the reclamation of the Blackfeet Indian Reservation as an alternative plan in the failure to arrange with Canada for the equitable division and use of the waters, in what respect would it adversely affect Canadian interests?

In the Second Annual Report (page 34), an accidental reference is made to the duty of water at the St. Mary dam—there stated at 3 acre feet per acre. Elsewhere in the report referring to the Marias and Lower Milk river project the duty is stated at 2 acre feet per acre, the Sun river project at $1\frac{1}{2}$ acre feet per acre and in the Sixth Annual Report, page 111, under the heading 'Lower Milk river Project,' it is stated 'the average duty of water, from measurements taken on private canals, is 18 inches.' The higher duty stated for the St. Mary reservoir is undoubtedly to cover losses from seepage and transportation to the irrigable area.

It would seem reasonable to conclude that if the St. Mary river project were confined exclusively to the reclamation of the lands in the Blackfeet Indian Reservation the capacity of the St. Mary reservoir would be limited to 250,000 acre feet or less. It is possible, indeed, that the comparatively recent suggestion to reduce the capacity to 150,000 acre feet may have been influenced by this consideration. The first time the reduced capacity is mentioned is in the Fourth Annual Report for 1904-5, at page 180, as follows:—

The first plan for storage on St. Mary lakes involved the construction of one earthen dam about 50 feet high at the outlet of the lower lake. Lately consideration has been given to the construction of a dam between the lakes, or at the outlet of the upper lake, and studies at various heights at both locations have been made. The difference of elevation between the two lakes is 12 feet. * * * Provisions for lowering the upper to the level of the lower lake have also been studied * * * Effective height of dam, 31 feet. Provision is also made for excavating the channel between the upper and the lower lake, so that the former can be drawn down to the elevation of the latter lake. The reservoir capacity under these conditions will be 150,000 acre feet.'

No mention is made of this feature in the Fifth Annual Report and only the following brief reference in the Sixth Annual Report, page 115.

'It is proposed to build a low storage dam. * * * The dam will have a maximum elevation of 45 feet above the bed of the river. The effective height will be 30 feet. The reservoir thus created will have a capacity of 150,000 acre feet.'

Assuming, the reservoir to be developed to 250,000 acre feet capacity, however, it would not seriously affect Canadian interests. The records of flow of the St. Mary river near the international line show that in 1903, the flow of the stream approximated 250,000 acre feet in the winter months of November, December, January, February and March, while the mean flow in the five years 1902-1906, inclusive, show over 121,000 acre feet during these months, and the balance could be diverted or stored in the other months, without appreciable loss to the Canadian consumer of water.

An ingenious table was constructed at Washington during the visit there of Messrs. Galt and Magrath in June, 1905, which endeavoured to show that the United States could, by diversion and storage, at St. Mary reservoir, practically absorb all the water of St. Mary river, and that during the years 1903 and 1904, with the

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diversion canal flowing 1,000 cubic feet per second continuously during the irrigation season, there would, in addition to the quantity of water so diverted, be an *accumulated* storage of over 500,000 acre feet. Such a condition is of course possible, but it would mean the construction of a dam of an effective height of over 70 feet, in place of 50 or 30 feet now considered, and that would involve greatly increased expenditure in addition to that now contemplated, which approaches, if it does not exceed, the limit for a practicable enterprise, even from the view point of the United States government.

The interests of the Canadian consumer of water would not be imperilled, his share in the direct flow of the stream would not be seriously diminished if the United States would store the winter flow of the stream. With the St. Mary reservoir constructed, the United States would be in a better position to conserve the winter flow than Canada could possibly be. The flow would, naturally, be impounded in the reservoir, while, in Canada, artificial channels would have to be constructed to divert the flow from the stream bed to the reservoir sites removed from it and that always entails added expense and risk and danger of loss of retaining the available supply. To secure the most thorough conservation of the available water supply the retention by the United States of the winter flow in the St. Mary reservoir is the natural course to pursue. If, however, in the event of a failure to agree on some plan of division, the United States should not adopt the course of conserving the winter flow and resort to storage in other seasons of the year, it would be Canada's policy to care for the winter flow at added expense to balance the loss ensuing in the irrigation season resulting from any diversion or storage by the United States in that period.

Reference has been made to the possibility of the United States relying solely upon the direct flow of the stream during the irrigation season for the amount necessary for the full supply of the acreage in the Blackfeet Indian reservation, which has been estimated at 1,000 cubic feet per second.

If that diversion were made directly within United States territory, there would be left for Canada, on the mean flow of the stream as shown by the records from 1902-1906, the following:—

	Second feet.
April..	0.00
May..	600.80
June..	2,159.00
July..	1,029.00
August..	23.60
September..	0.00
October..	0.00

Save in the month of June, this would be entirely inadequate for the requirements of Canada, and resort would then be had to storage or diversions from other sources of supply.

That condition, however, presumes that the United States would propose to ignore all recognition of prior existing rights on the stream, either in their own territory or in Canada. And, it does not appear that the United States is prepared to assume such an attitude, even in the extreme event of a disagreement with Canada as to the division and use of waters in international streams.

Outside of the declaration in the memoranda submitted to Messrs. Galt and Magrath in June, 1905, which can scarcely be regarded as an official utterance, that no servitude could lie against the United States for any water that occurs in its territory, there is no statement in any official document or report that would suggest that the United States authorities will refuse to recognize the vested rights of any consumer of water to his legal appropriation. On the contrary, there are several utterances that clearly indicate a solicitude to respect such rights.

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In the document emanating from the United States Secretary of State, June 15, 1907, there is a specific declaration that Canada shall respect the amount of water diverted from the Milk river in the United States, for beneficial purposes by private canals prior to November 1, 1905, and that the United States shall respect the amount of water diverted from the St. Mary river in Canada for beneficial purposes as of the same date. Upon that feature, there may be disagreement only as to the amounts to which such appropriators are entitled.

In additon to this, however, there is a significant pronouncement in the Third Annual Report, page 306, in which the Consulting Engineers, Messrs. Davis, Wiser and Savage reporting on the St. Mary Milk river project, say:—

‘It should also be emphasized that any recognition of rights for the diversion of water from Milk river are necessarily subject to the prior rights of inhabitants of Milk River Valley, in Montana. * * * Neither the American nor the Canadian Government has the right to interfere with prior appropriations either from St. Mary or Milk river.’

In other words, the doctrine of prior appropriation of water in the streams of the arid region is recognized as paramount to all other principles of government of the flow of water, and that is true whether the streams are all in one country or in two countries with different governments and laws. Apart from that consideration, if, in the failure of the United States and Canada to agree upon some plan for the division of water in St. Mary and Milk river, the United States should undertake the Blackfeet project as an independent enterprise and divert sufficient water for that purpose regardless of the prior rights of individual appropriators from the stream in Canada, it would thereby merely present the opportunity to Canada to take reprisals in the Milk River Valley. Canada could not affect the United States appropriator from the Milk river to the same extent, in volume of water, as the United States could affect Canadian appropriators in the St. Mary river, but a larger number of individual interests would be affected and these a class of interests which the United States government are not willing to prejudicially affect.

To summarize the situation as it is affected by the alternative plan to reclaim lands in the Blackfeet Indian Reservation by the waters of the St. Mary river, the conclusion is that the project scarcely justifies the expenditure that would be involved and that in the event of the United States proceeding with the project, regardless of financial returns, the amount of water reasonably diverted for such purpose cannot seriously imperil Canadian interests, unless the United States proceed to the extremity of ignoring the prior appropriations of Canada, which, while possible, is not probable in consideration of all the interests elsewhere that would thereby be affected.

The last of the three courses outline originally for the utilization of the waters of the St. Mary river—what is known as the Marias project—does not seem to be worthy of serious consideration and as a project connecting the waters of the St. Mary and Marias rivers in one enterprise has apparently been disregarded by the Reclamation Service officials themselves.

It may be well, however, to briefly refer to its salient features, so that the character of any possible enterprise that may divert St. Mary river water to the detriment of Canada's interest may not be overlooked.

This scheme would involve the construction of a main canal from the St. Mary river (1) across the South Fork of Milk river, a distance of 43.8 miles, (2) a continuation of that canal from the crossing the South Fork to Cutbank creek, a further distance of 25.9 miles, (3) running the diverted waters through the natural channels of Cutbank creek and Marias river, 100 miles or more (no expense involved, (4) the construction of a dam in the bed of the Marias, 195 feet high and 2,246 feet long on top and (5) the construction of a main diverting canal thence to the lands in the lower Milk river valley over 75 miles in length.

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In none of the reports is any estimate found of the cost of the main canal beyond the crossing of the South Fork, there is no record of any survey having been made beyond that point towards the Marias river or Cutbank creek.

And it would appear that any consideration of combining the two streams had been early abandoned, as in the Fourth Annual Report for 1904-5 it is stated, page 185:—

During the earlier stages of the investigation, the development of Marias river was considered as a connecting link between the St. Mary basin and the lower Milk river valley. As a result of later surveys it is now believed best to consider the diversions from Marias river as a separate project not connected with the Milk river project.

No mention is made of the Marias project in the Fifth Annual Report, but in the Sixth, for 1906-7, reference is again made to it, at page 121, in substantially the same language as quoted above, with this significant addition.

Various consulting engineers have examined this project but it has not yet received formal approval on account of the unusually difficult engineering features.

These features are mainly the dam already mentioned, 195 feet high and the construction of a canal out of the river canyon, the bed of which canal is designed to be 170 feet above the bed of the stream.

The dam is merely a diversion and not a storage dam, though it might be concluded to be the latter from superficial perusal of the reports, which state that between the elevation of the bed of the canal and the top of the dam the storage capacity is in excess of 450,000 acre feet. But it is not to be considered that storage would be permitted to the elevation of the top of a dam built in the bed of a stream of the torrential character of the Marias river and the plans provide for a spillway whose elevation is 15 feet below the top of the dam.

No estimates have been published of the probable cost of the Marias project, as an independent enterprise, and none of the cost of extending the St. Mary project to permit its waters to run into Cutbank creek.

There is, however, the estimate of the cost of the canal to the crossing of the south fork of the Milk river, given in the First Annual Report, page 211, as \$1,397,000.

At page 212, of the same report, an estimate of \$12,000 per mile is placed upon the first 20 miles beyond the South Fork in the canal heading towards Sage creek, and, as the country is of much the same general character towards Cutbank creek, this estimate may be accepted for the present purpose. There are 19.3 miles of canal from the South Fork to Cutbank creek, which at \$12,000 per mile would cost \$231,600, to which should be added 15 per cent for engineering and contingencies—\$34,740, in all \$266,340. This added to the cost of the South Fork would give a total of \$1,663,340 as the necessary expenditure to Cutbank creek.

Some notes should be made in that connection. In the estimate in the First Annual Report, the section 'from head to North Fork of Milk river,' is placed at \$533,500, while the only bid submitted amounted to \$767,500 for practically one-half of this distance, which would indicate that for this section at least, the estimate should be multiplied by three to give an approximation of the cost. On the same section, engineering and contingencies are placed at \$120,530, while it has already been shown that \$147,656.85 have been expended under this item with practically no construction work completed.

To the above must be added the cost of the dam in the bed of the Marias river, and of the 75 miles of canal line from that river to the Lower Milk river valley, the first 17 miles of which are canyon work—the first six in 'steep side hill construction of soft sand-stone in horizontal strata.' The cost of the canal line and part of the cost of the dam, even if the Marias project is otherwise utilized for the irrigation areas apart from the Lower Milk river valley would be chargeable to the St. Mary project. And while it is not possible to make any approximation of the total cost, it must be evident

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that an expenditure of from \$3,000,000 to \$5,000,000 is inevitable if the United States is compelled to divert the St. Mary river to the Lower Milk river valley, via the Marias river route.

It is not surprising, therefore, to find that the Reclamation Service officials have tacitly abandoned this third alternative plan nor to find the consulting engineers reporting (Third Annual Report, page 307) that:

‘It appears probable that if the Canadian Government does not make satisfactory guarantees to justify the construction of the St. Mary reservoir and canals, the Marias drainage basin can be made to serve all available lands in Milk river valley * * *

even when they add—

‘It is probable that the acreage cost will be greater than that of St. Mary * * .’

Upon the alternative plan of the Marias river route, therefore, there is no room to conclude otherwise than that the United States will not adopt it, in the event of failure of negotiations with Canada, solely on account of the expenditure involved.

The situation is plainly that the United States desiring to impound water of the St. Mary river within its own territory and to divert the same to the Lower Milk river valley, after 8 years of investigation, has abandoned all other routes as impracticable on the ground of expense, is now knocking at Canada’s door for possession of a right of way and the occupation of an existing canal or channel naturally constructed—the bed of the Milk river in Canada. Failing to secure that on reasonable terms, the United States will develop an enterprise to reclaim the Blackfeet Indian Reservation at a cost in excess of what the Reclamation Service officials have regarded as the limit of expenditure of similar enterprises. For this privilege of possession, the price to be paid is ‘the equitable division and use of the waters of both streams in either country.’ And it is for Canada to fix that price—the consideration being ‘water’—the most valuable commodity to the section of Canada affected, now and in the future, and it is incumbent upon Canada, for the present interest and future welfare of Alberta, to secure the highest price possible for the advantage the United States desires.

Before proceeding to outline the various details which should, for Canada’s interest be embodied in the agreement between the two countries, it is necessary to comment upon the proposal submitted by the United States officials of date June 15th, 1907.

It is proposed in paragraph 2, that during the period from March 1st to September 30th of each year the ‘*water available for irrigation*’ in the two river systems shall be apportioned equally to each of the two countries.

The phrase might more appropriately, more concisely and more specifically be ‘the natural flow’ of the two streams to which, it will be noticed, the document subsequently reverts.

The equal division does not seem to be borne out in detail at a later part of the document. Paragraph 5, contains a detailed statement of the share to which each country shall be entitled, which detail does not carry out the equal division, or the language employed is misleading. Under the terms of this paragraph, the United States would be entitled to ‘all the water of the St. Mary river and its tributaries diverted in the United States for use in its territory and not delivered into Milk river or its tributaries.’

This may mean all that water *now* diverted from the St. Mary river in the St. Mary river valley within the territory of the United States. If that is intended, the date and amount of the appropriation of such water relative to the date of appropriation of the Canadian canal from the St. Mary river should be stated. If such appropriation is prior to the Canadian appropriation, it would have the superior right—if not, Canada should have the first right and that should be so defined, as

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Canada is elsewhere in the document required to recognize the prior appropriation within United States territory.

The same remarks apply to subsection (b) with reference to appropriations within United States territory from the Milk river above the crossing of such streams (Milk river and its tributaries) into Canada, presumably the Western crossing.

Subsection (c) certainly does not carry out either the letter or the spirit of the general pronouncement of the equal division of the waters of the two streams. It declares that the United States shall be entitled from March 1st to September 30th to 'all water of Milk river not in excess of 2,000 cubic feet per second flowing into the United States at the eastern Milk river crossing of the International Boundary.'

It is true that statement is qualified by the parenthetical addition (including stored water of the St. Mary river turned into it). But there would be times and seasons when such stored water would not be turned in and even then, by the terms of this subsection, the United States would be entitled to 2,000 second feet of the flow of the Milk river, if that amount of water was flowing in the stream. It is also true that if that amount of water, or more, reached the Eastern Milk river crossing of the international boundary, as the natural flow of the stream after Canada has been permitted to divert its share, the United States would be entitled to divert it, but it is noticeable that no provision is made for Canada's diverting any part of it—the statement is merely that the United States shall be entitled to all the water of Milk river not in excess of 2,000 second feet, and, in the sense of phraseology at least, is at variance with the purported spirit of the agreement.

In the same sense, the language employed in the subsections of this paragraph dealing with Canada's interest is misleading.

Subsection (d) provides that 'all water of St. Mary crossing the International Boundary into Canada not in excess of 2,000 cubic feet per second,' shall be Canada's share.

But that is not the agreement in the preceding part of the document. There it is declared that the water available for irrigation in the two streams shall be apportioned in equal amounts. If the flow of the St. Mary river on the 25th day of June was 7,000 second feet, at the International boundary or at any point above the Canadian intake, Canada would be entitled to 3,500 second feet of that flow—there is no suggestion of a limitation to 2,000 second feet or any amount other than one-half the flow of the river.

Subsection (e) provides that Canada's share shall include 'all water of Milk river and its tributaries diverted in Canada for use in its territory including any water of St. Mary river turned into Milk river by Canada and which has been measured under item 'd.'

The agreement is that Canada shall be entitled to one-half of the water in Milk River. The language of this subsection would seem to convey the right to Canada to divert all water in the stream within its territory.

Altogether paragraph 5 is ambiguous and misleading and appears to be wholly unnecessary. It is plain that the document intends to convey the right to each country to divert for its own use within its own territory, one-half of the water in each stream, and it is further intended that each country shall have the right, subsequently, to turn its share of water in either stream into the other stream and thereupon divert it, to its own use in its own territory.

Paragraph 3 provides that the failure of either country to fully utilize its rights under the agreement, shall not add to or diminish the rights of the other country. But it should provide that the other country may avail itself of the water in excess of its share not otherwise fully utilized; on the general understanding that this agreement contemplates the fullest conservation of all the waters of both streams by the two countries interested.

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Paragraph 4 provides for the utilization of what may be termed the winter flow of the streams and proposes to give the United States the flow of the St. Mary River and Canada the Milk River during that period. There is no objection to that arrangement, but it may be pointed out that thereby the United States secures much more than an equitable division of the waters. During the months from October 1st to March 1st, the mean flow of the St. Mary river at the International boundary for the years 1902 to 1906, inclusive, has been 132,629 second feet, while the mean flow of the Milk river, for the same period, at Havre for the years 1898 to 1906, inclusive, has been 47,789 second feet, or slightly in excess of one-third of the St. Mary flow. And the flow of the Milk River in Canada, at or near the intake of the Canadian canal would be very much less than at Havre, in many months it would be *Nil*.

Before leaving these features of the document, attention should be directed to the division of the seasons, from March 1st to September 30th of each year being proposed apparently, as the 'irrigation season,' while from October 1st to March 1st would be the winter or 'non-irrigation season.' To such division, Canada must enter the most emphatic objections. Ordinarily, and particularly in localities similar in all conditions, climatic and other, to Montana and Alberta the 'irrigation season' extends from April 1st to November 1st, the experience in Alberta, and Montana in its northern section is entirely similar in all affecting conditions, has suggested a later commencement to the 15th of April or 1st of May. Water for irrigation purposes—for fall ploughing if nothing else—is required to the end of October or as late in the season as water will run in the canals without danger to structures from freezing.

The seasons must be divided as from April 1st to November 1st for the 'irrigation season' and from November 1st to April 1st for the 'winter season' and upon that Canada must insist.

Paragraphs 6 and 7 will be considered in connection with the duty of the commission to be appointed for the carrying out of the agreement and the division and distribution of the waters of the streams.

There is no objection to paragraph 8, save that provision should be made to bring the United States under the same mandate, as Canada would inevitably seek to return into Milk river waters from St. Mary river—stored or direct.

Paragraph 9 provides for the recognition of prior appropriators from the Milk river in the United States antedating November 1st, 1905, and binding Canada to observance of the amounts as judicially determined. Merely as a matter of record, the date must be changed to May 1st, 1903, that being the date of the commencement of construction of the Canadian Milk river canal, from which, were the Milk river all in one country and one irrigation district, Canada would seek to have its decree of appropriation for beneficial purposes dated. It could comply with all the ordinary requirements of judicial investigation of such matters, surveys were then commenced construction followed with due diligence and application to beneficial purposes followed on the completion of construction.

There is some room to doubt the advisability of blindly accepting the judicial determination of the appropriations of water in the Lower Milk river valley. There has been many instances of 'swollen decrees' in the arid regions of the United States and under the conditions which have prevailed in that district in the past few years with public opinion fomented on the question of the diversion of waters of International streams, there is every likelihood that an effort will be made to secure large decrees in all probability in excess of the actual carrying capacities. As Canada is to be brought under the operation of such judicial determination, in the event of an agreement between the countries, and as adjudication has not yet been made nor is likely to be made for some time to come, it would not seem to be unreasonable to ask that Canada should be permitted to have its day in court on that matter. It would, at least, be the part of prudence for Canada to make systematic measurements of the various

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canals and ditches seeking for decrees. In doing so there would be no unusual or unprecedented act, the officials of the Reclamation Service have measured the dimensions and capacity of the St. Mary canal of the Alberta Railway and Irrigation Company, without asking permission to do so.

Paragraph 10 provides for a similar recognition by the United States of the prior appropriation of Canada in the waters of the St. Mary river, setting the date at November 1st, 1905, and the amount, by measurement (of the United States officials) at 310 cubic feet per second.

While the present information is that there is no appropriation in the United States prior to November 1st, 1905, again merely to preserve the records, this date should not be admitted. It would be entirely within legal limits in other irrigation districts to give to this appropriation the date of the original filing by the Dominion government of the intent to divert and appropriate water for beneficial purposes (September 21st, 1897), and in any event, this should not be later than July 10th, 1898, the date on which the Alberta Railway and Irrigation Company commenced surveys, which were duly followed by construction, by diversion and by application to beneficial purposes.

On the question of the amount of that appropriation full discussion has elsewhere been fully made.

Paragraph 3 relieves the United States from all liability from damage of any kind in the channel of Milk river.

This feature merits very serious consideration and its determination may affect the price paid by the United States for the privilege conveyed. The position that country would occupy is a distinctly unique one. It obtains possession of a right of way and a naturally constructed channel of over 215 miles in length, of the capacity of, at least 2,000 second feet and seeks to avoid the cost of maintenance, which, otherwise, as in an artificially constructed canal in its own territory, would be a considerable item. Damage will occur and expense accrue, in spite of the most careful conduct and management of the transported waters. In the past, the stream volume has been erratic and fluctuating, in years of high floods, the maximum volume has been of short duration, and for the greater part of any season and from one season to the other the channel has been almost dry. In the future, there will be annually in addition to the natural flow, be that great or small, the continuous flow for a comparatively lengthened period of a body of water which approximates the maximum discharge of the stream as shown on the records of the past few years, embracing seasons of high floods.

The gradient of the stream averages throughout the distance to be utilized by the United States in the transportation of these waters, that is down the North Fork and the main stream from the western to the eastern crossing of the International boundary, a distance of 215 miles, a total fall of 1,474 feet, or practically 7 feet per mile throughout. That rate of gradient, of course, changes in certain parts of the route and becomes less as the stream proceeds east; from the junction of the two forks to the eastern crossing the average fall is $5\frac{1}{2}$ feet per mile, and it is, undoubtedly, less than that at the extreme eastern portion of its course in Canadian territory.

The soil composing the bed of the stream is largely of fine mud, and with the declivity continued above erosion is inevitable.

Upon this feature, there is the preliminary report of Mr. Louis E. Fontaine, who, during 1907, conducted a survey to determine the elevations along the course of the river, and from that report the following extract is made:—

‘Respecting the intention of the United States government to divert water from St. Mary lakes into Milk river, and running the same through Canadian territory, this scheme, if carried out, will, I believe, do no end of damage to the river flats in ranges 15 to 23. The existence of canyons and narrow gorges in ranges 14 and 15 have the effect of holding back the water, and, under existing conditions, more or less damage is done by floods at every freshet, and if the present flow of the river

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is to be increased, it is more than evident that the lands adjacent to the river in above-mentioned number of ranges will, thereby, be greatly affected."

The result of such erosion would be most readily and detrimentally experienced by the United States itself, in the event of the construction of the Chain Lakes reservoir, where silt will surely accumulate, but erosion may, doubtless will, affect vested interests in the valleys within Canadian territory, and it may be found necessary to maintain elevations by the erection of structures, all of which, under the present proposal, would be borne by Canada. There are now certain structures on the stream, the dam at the intake of the Canadian canal and the railroad bridge crossing of the Alberta Railway and Irrigation Company, and these, as well as highway bridges that will be constructed, might, sooner or later, be damaged if only by the effects of erosion.

Certainly, provision should be made that stored waters be turned into the channel of Milk river only at such times as shall be permitted by and shall always be under the control of the commission to be created. And further than that, every consideration indicates the justice of some form of compensation for maintenance—at least that the United States should pay for the construction of checks or drops and the repairs of damage to all existing structures that have, in the judgment of the commission, been caused by the continuous flowing of water turned into the channel by the United States.

And it should be provided that the United States shall be liable for any damages created in the St. Mary river in Canada in the event of any accident occurring to the dam of the St. Mary reservoir. For such damage within its own territory, the United States would be legally liable—the extension of the liability across the boundary line should justly be made.

The creation of a commission to carry out the provisions of any agreement between the two countries is inevitable—it is not necessary that such commission should exceed two—one appointed by each country, and an oversman. Provision for the expense of the commission may be implied, it should be specified that each country should pay its own commissioner and one-half of the salary of the oversman, and the general expense of the commission should be borne equally by both countries.

The commission would be empowered with the general supervision and management of the waters of the two streams, and the division of these in accordance with the provisions of the agreement, and for that purpose, would provide for the operation of the joint system by rules and regulations that would be deemed necessary and in accordance with the requirements. The commission would primarily arrange for the establishment of such means of measurement of the two streams and their various tributaries, from which would be determined daily the amount of the available natural flow to be divided, and similar provision would be made for the measurement of all stored water to be subsequently turned into either stream by either country. For the purposes of the original agreement, the provision for the creation of a commission need only be treated in a broad general sense, the details of its powers and functions to be considered later, at the time of its creation.

The following suggestions are made of matters that should be embodied in the agreement, the form and language to be used in such would probably be left for the legal advisors of each country to outline.

St. Mary River.

That the United States shall be entitled to all the water of the St. Mary river at the dam site of the St. Mary reservoir, for storage in the said reservoir, during the months of January, February, March, November and December, in each year.

That Canada shall be entitled to divert from the natural flow of the St. Mary river, through the canal of the Alberta Railway and Irrigation Company, or other

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means, 1,400 cubic feet per second during the months of April, May, June, July, August, September and October, in each year.

That the excess flow in the St. Mary river during the months of April, May, June, July, August, September and October, in each year, above 1,400 cubic feet per second referred to, shall be divided equally between the two countries.

Milk River.

That the United States shall be entitled to all the water of Milk river during the months of January, February, March, August, September, October, November and December in each year.

That Canada shall be entitled to divert from the natural flow of the Milk river, through the canal of the Alberta Railway and Irrigation Company, or other means, the present capacity of that canal agreed upon between parties to be 330 cubic feet per second during the months of April, May, June and July in each year, subject to the rights of appropriations from the Milk river with the territory of the United States prior to the date of May 1, 1903—as that amount shall be judicially determined and now understood to be about 350 cubic feet per second.

That the natural flow in the Milk river during the months of April, May, June and July, in each year, in excess of the amount of 330 cubic feet per second and 350 cubic feet per second, more or less, shall be equally divided between the two countries.

That Canada shall not be entitled to divert any portion of waters stored by the United States in the St. Mary river and turned into Milk river and in no event be entitled to divert any water from Milk river except during the period mentioned above, and in the amount mentioned above, unless it shall turn into the channel of Milk river any water from other sources, to which amount it shall be entitled to divert, less due allowance for losses in transportation.

The failure of either country to fully utilize the rights hereby agreed to shall not be regarded as adding to or diminishing the rights of other countries, but either country shall be entitled to avail itself of any water utilized by the other country under the terms of this agreement.

The amounts of water chargeable to each country under the several items enumerated above shall include all the water of the two river systems whether used directly or indirectly by the two governments or by private parties in their respective territories.

That in no event shall either country divert from either stream any portion of water stored by the other country and turned into the other stream, but each country shall, in addition to its share of the natural flow of each stream as previously provided by this stream, be entitled to the full amount of water turned by it into each stream from stored supplies or from the other stream, due allowance being made in all cases for losses in transportation, from evaporation, seepage or percolation, to be determined and fixed by the Commission to be created for carrying out the provisions of this agreement.

That the share of the United States shall in any event include so much of the available natural flow of the Milk river within its territory as represents the amounts of the appropriations of water from said stream by private appropriators, as shall be judicially determined to have been applied to beneficial use on or before May 1, 1903, in the Lower Milk river valley in Montana: Provided, that at the time of such judicial determination, Canada be permitted, if it shall so elect, to be present and to submit any facts or information that may affect any such judicial determination in time or in amount of the various decrees to be rendered.

It is further agreed that, wherever one-half of the natural flow of the Milk river shall be less than such amount as measured aforesaid, the share of Canada shall be diminished so that the said country shall receive of the natural flow of the entire

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Milk river system only the excess, if any, beyond such amounts as have been judicially determined, due allowance being made for all losses in transportation and for the increment of return or seepage waters within the territory of Canada.

The share of Canada shall in any event include so much of the available natural flow of the St. Mary river as has been appropriated by the authorization granted by the Dominion Government to the Alberta Irrigation Company and diverted and applied to beneficial use by its canal heading from the said St. Mary river as of date July 10, 1898, the same to be measured at the intake of the said canal, and that amount shall be subject to the appropriation of any amount of water diverted and applied to beneficial use by any appropriator within the territory of the United States, if the same is prior to the date of July 10, 1898.

It is understood that the amount of water which Canada, through the agency of the Alberta Irrigation Company, is entitled to, as of date July 10, 1898, is 1,400 cubic feet per second.

The term, natural flow, as used herein, is to be understood as the flow of each river system, from all its sources, which would pass the point or points specified in this agreement, if no artificial obstruction has been placed in the stream or any of its tributaries and if no water had been diverted from or added to the flow before reaching the point or points specified, and the amounts of such natural flow shall be determined by the commission to be created for the purpose of carrying out the provisions of this agreement.

That the United States shall be liable to Canada and to any citizen of Canada for any and all injury or damage created by failure of any artificial structure built by the United States within their own territory, but in connection with the development of this enterprise of combining the waters of the St. Mary and the Milk rivers, or for any and all damage caused by the United States diverting water into either stream from the other. The United States shall further be liable for the cost of maintenance of the stream bed of the Milk river and for the cost of all structures rendered necessary to maintain and protect the vested rights of the Canadian government or of settlers in the Milk River valley, within Canadian territory, and for any and all damage to existing structures on Milk river, in Canadian territory, whether these are owned or controlled by the Canadian government or by private parties.

That for the purpose of carrying out the provisions of this agreement, a commission shall be created which shall have supervision of the diversion of the waters of the two rivers, and the measurement and distribution thereof in accordance with the terms of this agreement. The commission shall be empowered to make such rules and regulations as shall be necessary for the proper and effective operation of this agreement. The commission shall consist of one member, appointed by the Governor General of Canada, and one member appointed by the President of the United States, and those two members shall be empowered, in the event of a disagreement between them upon any matters arising out of this agreement, to select a third member, when the commission shall consist, for the purpose of deciding any point of disagreement, of these three members.

It is understood and agreed that each country shall pay for the services and expenses of its own member of said commission, but shall bear one-half of the expense of the additional third member, whenever required, and of the general expenses of the commission.

For the purpose of clearly outlining what Canada's share in the waters of both streams would amount to, in practical form, as relating to the irrigation possibilities of the area tributary to the streams, Tables C, D, E and F have been prepared and are hereto annexed.

Tables C, D and E consider the result of the proposal on the basis of the mean flow on the streams, and table F considers the result on the basis of the recorded flow in a season of high water, as 1903.

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In years of mean flow, Canada would receive (1) sufficient water to directly supply 210,000 acres of land with $1\frac{1}{2}$ acre feet throughout the year, (2) for the full supply of Lumpy Butte, Chindler, Mary lake, Taylorville, Milk river and Raymond reservoirs, in all 163,542 acre feet, and (3) nearly two-thirds supply from the Brunton and Shanks lake reservoirs, in all 123,139 acre feet.

The total reservoir supply would aggregate 286,681 acre feet, which, upon the duty of $1\frac{1}{2}$ acre feet per annum, would provide for the irrigation of 187,787 acres of land, in addition to the 210,000 acres of land provided for from the direct supply of the stream.

In years of high flow, such as 1903, Canada would receive (1) sufficient water to directly supply 210,000 acres, as in years of mean flow, and (2) sufficient water for the full supply of all reservoirs at present within the scope of the territory explored, with the exception of Crow Indian lake—in all 489,889 acre feet and there would be 4,100 acre feet surplus. The total supply would care for 539,327 acres, on the duty of $1\frac{1}{2}$ acre feet per annum, compared with 630,000 acres now known to be within the scope of an irrigation system.

It is proper to add, at this time and in this connection, that with the prevailing climatic conditions, the duty of $1\frac{1}{2}$ acre feet per annum is ample for the successful cultivation of the character of crops best adapted to that region.

It would appear probable that Canada would more frequently secure the maximum delivery than the tables would indicate. 1903 is the only year embraced in the tables which shows a high flow in the St. Mary river, while it is well known that 1902 was as high, and higher in certain months of the year—the latter part of May and all of June and July, while 1907 was also a year of high flow—exceeding 1903 in net yield throughout the irrigation season.

In years of mean flow, the United States would receive 338,900 acre feet which would represent 1.58 acre feet per acre per annum on the area actually irrigable in the Lower Milk river valley 215,000 acres in place of 250,000 acres (see Fifth Annual Report Reclamation Service, page 154). In years of mean flow, the United States would receive a slightly greater duty of water *for its whole irrigable area* than Canada would for two-thirds of its present known irrigable area.

In years of maximum run off, the United States would receive 604,820 acre feet which would be in excess of the present contemplated capacities of its reservoirs, the St. Mary reservoir 150,000 acre feet and the Chain Lake reservoir 437,500 acre feet. And it would give a duty of 2.81 acre feet per acre per annum on its whole irrigable area in the Lower Milk river valley.

So far as the relative irrigable areas in each country are considered it must be admitted that Canada's proposal represents a fair and equitable division of the waters of the two streams and in regard to the interests, present and future, of the principality that is Canada's, no other division that would mean for her a smaller share of water should be considered.

If that territory were to be valued at the present rate applied by the Reclamation Service for irrigated lands in the Lower Milk river valley—\$40 per acre—there is for 630,000 acres a value of \$25,200,000 and Canada cannot, at this or at any other time, afford to throw away the opportunity to create such value, even if it takes a generation to realize it, as it doubtless will.

The position, in relation to the St. Mary river and its water supply, occupied by the appropriation of the Alberta Railway and Irrigation Company is, in a legal sense, as the law is constructed by the courts of the said region, invulnerable.

It could be contended that that company is merely the agent of the government of Canada, and, as has already been pointed out, that the government is, on somewhat different lines, carrying on the same policy within its territory as the United States is pursuing under the Reclamation Act.

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The Alberta Railway and Irrigation Company, in other words, is the successor of the Government of Canada in the appropriation of water from the St. Mary river, under order in Council, September 21st, 1897, as it is, as a matter of fact, by the authorization of the Government, giving the Company a license for 500 second feet of the low water flow and 2,000 second feet of the high water or flood flow of the St. Mary river and granting the Company 15 years in which to complete its works.

In effect, the Irrigation Company in no respect differs from similar irrigation companies in the said regions of the United States, where such companies, commencing upon undertaking of this magnitude, would make a filing against the waters of the stream upon a certain date and would be granted that appropriation from that date upon satisfying the proper authorities that the acts constituting appropriations, the diversion and application to beneficial use, had been carried on with due diligence and within a reasonable time.

It would not have been the part of commercial wisdom or of ordinary prudence for the Alberta Railway and Irrigation Company, or its predecessor, in 1898, to have constructed a canal with a capacity of 2,000 second feet, as it must have realized, even without experienced advice, that considerable time would elapse before that capacity would be consumed, in a then uninhabited region. It was certainly the part of wisdom and the exercise of good business sense, at the same time keeping good faith with the government to do exactly as has been done, develop and enlarge their system in relation to the demands upon it, with due diligence prosecuting the work to which they had put their hand and given their pledge.

It would not be necessary to make any extended argument to convince a referee in the adjudication of decrees of appropriation in any arid region of the United States, that, under such circumstances, the company was entitled to the protection of the court and an award of the full amount of their claim from the date of original filing. The whole subject is most exhaustively and yet concisely treated in Mills Irrigation Manual, Chapter 6, Parr. 48 to 51, inclusive, 'The Doctrine of Relation,' the whole of which might be quoted to the advantage of this consideration. But one sentence will indicate the strength of the contention that the Alberta Railway and Irrigation Company's appropriation should be respected in its full amount.

Diligence has been defined to be the 'steady application to business of any kind, constant effort to accomplish any undertaking.'

This proposition is so plain that it would be considered idle to discuss it in any irrigated section of the United States and the assertion is ventured that if the conditions which to-day exist in the St. Mary river on both sides of the international boundary existed in any stream in Colorado, where a ditch company had a filing similar to that of the Alberta Railway and Irrigation Company and the United States Government had a project similar to the St. Mary reservoir, the officials of the Reclamation Service would not dare to set up the claim in any court of competent jurisdiction that the prior appropriator should be reduced to the quantity of water then flowing in its canal.

Only the fact that an imaginary line divides this source of water supply would seem to justify the extraordinary attitude these officials assume. And yet, there is contained in the letter from Hon. John Hay, secretary of state, of the 29th December, 1902, the following statement: 'It is proposed to deal with this matter in strict conformity with the laws concerning the rights to the use of the water as recognized by the courts of the arid region both on this side of the International boundary and on the other. The principle may be stated in the language of section 8 of the Reclamation Act of June 17, 1902 (32 Stat. 388).

'Provided that the right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated and beneficial use shall be the basis, the measure and the limit of the right.'

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And, in its full sense, the appropriation of the Alberta Railway and Irrigation Company complies with every requirement of that proviso, and with the provisions of the Northwest Irrigation Act, and with the authorization from the Dominion Government, it is appurtenant to the land irrigated and beneficial use shall be the basis, the measure and the limit of the right.

And the Secretary of State could have quoted with equal force the portion of Section 8 preceding the portion he did incorporate in his letter, which preceding portion provides that nothing in the Reclamation Act shall affect or interfere with the laws of any state or territory (on this or the other side of the boundary) relating to the control, appropriation, use or distribution of water used in irrigation, or any vested right acquired thereunder, and nothing in the Act shall affect any right of any State or of the Federal Government or of any appropriation or user of water from any interstate stream or the waters thereof.

To the proposition embodied in the proposal of the United States that the appropriations of the Alberta Railway and Irrigation Company shall be understood as 310 second feet to date from November 1, 1905, there is but one answer, that it shall be recognized as for 2,000 second feet from July 10, 1898, the date of the commencement of surveys.

In the draft submitted as the proposal of Canada, the appropriation has been stated as 1,400 second feet. And that solely for the reason that there is now tributary to the canal system of the Alberta Railway and Irrigation Company 210,000 acres available for irrigation and that, under the duty of 150 acres to the second foot specified in the water contracts, would call for 1,400 second feet. That reduction from 2,000 second feet is a concession to the existing condition and an effort to arrange a fair and equitable division of the waters of the stream. Legally, Canada can stand on the claim for 2,000 second feet; by extension of the canals, the area that would consume that quantity can be readily obtained.

On the Milk river, the position of the appropriation of the Alberta Railway and Irrigation Company is analogous, though it has been considered on somewhat different lines. The authorization from the Canadian government gives the company the right to 500 second feet in low flow and to the 1,500 second feet in flood flow, with 15 years to complete the works. Canada's proposal arranges for the diversion from the Milk river in Canada of only 330 second feet during the summer months, and one-half of the flood flow above that quantity. The stated quantity in the present capacity of the constructed canal which was designed and built solely for the purpose of diverting flood waters and storing them in the Milk river and Raymond reservoir for use in connection with the St. Mary canal and in other reservoirs on the Milk river drainage.

Recognition was made of the prior appropriations by American consumers of water in the Lower Milk river valley and reference to Table B will show that the mean flow of the stream will ordinarily during the months from April to July, inclusive, provide for these prior American rights and the Canadian appropriation of 330 second feet.

Above that would be flood flows which it would be and has been Canada's purpose to conserve and, on that feature, there is apparently no conflict between Canada and the United States.

In a memorandum from Hon. John Hay, Secretary of State, of date 10th May, 1904, it is stated:—

‘that the diversion of water in the upper part of the stream (Milk river) in Canada will work no injury during the time of floods, but that when the water is most needed, the taking out of the scanty supply will destroy the irrigated farms further down the valley.

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It is during the time of floods and only during that time, that the Canadian canal would fill the purpose for which it was designed, and Canada and Canadian settlers and irrigation purposes are just as earnest as the government and people of the United States in their desire to further the development of the arid region in the best way, the conservation of all the flood waters available in the region.

The secretary might well have added that when water is most needed, it is not to be had in the direct flow of the Milk river either in Canada or in the United States, as ordinary observation of that stream will demonstrate, as well as a study of the records of the stream flow maintained by the Reclamation Service.

The United States' proposal embodies a provision that the share of that country shall include the amount of water judicially determined to have been applied to beneficial use on or before November 1, 1905, by canals taking water from the Lower Milk river valley in Montana, with the understanding that such amount is in excess of 350 cubic feet per second.

Upon the principle involved in this feature there is no room for controversy, Canada has always been ready to recognize the doctrine of prior appropriations for irrigation purposes. The Canadian canal from Milk river was constructed with the view solely of diverting the flood waters of that stream for storage purposes. The available records of the flow of the stream at the time of its original construction clearly showed that it could not be relied upon, for a direct supply in any quantity and for any length of time, and its purpose was wholly to divert its flood waters to the reservoirs known as the Milk river reservoir and Raymond reservoir of the canal system of the Alberta Railway and Irrigation Company with the further purpose, in the ultimate development of that system, of conveying waters stored in the Shanks Lake reservoir to the lands that can be irrigated in the vicinity of the canal.

But, recognition has been made that there were prior appropriations in the Lower Milk River valley in amounts that were uncertain and undefined, as the fact that these rights are only now under judicial consideration shows.

The following statement of canals diverting directly from the Milk river in Montana, is taken from the Fourth Annual Report of the Reclamation Service, page 182:

Canal.	First used.	Capacity Measured.	Capacity Claimed.	Acres Irrigated.	Total, 1904.	Discharge, 1905.
		s. f.	s. f.	acres.	s. f.	s. f.
Fort Belknap	1894	130	750	10,900	16,678	13,969
Paradise	1895	19	50	1,400	1,902	1,974
Winters-Anderson.....	1900	12	100	440		
Harlem	1895	73	1,250	7,820	7,256	5,564
Indian Reserve.....	1901	125	125	1,000	.....	2,204

This table indicates the great difference between the capacity claimed and the capacity (actual) as measured presumably by the officials of the Reclamation Service, and that, in itself, should be a reason, if any were needed, for the right Canada should have and certainly should claim to be heard upon the judicial determination of these appropriations. Canada should, at least, make careful measurement of the capacities of these various ditches before entering into any obligation to recognize the judicial determination.

The following development of the prevailing duty of water from the above table is of interest:—

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Fort Belknap.. . . .	1.19 to 1.53	acre feet per acre.
Paradise.. . . .	1.36 to 1.41	" " "
Harlem..71 to .93	" " "
Indian Reservation.. . . .	2.20	" " "

It is not possible to state conclusively, of course, whether these various canals in these years secured all the water the irrigated lands required and the duties developed were *in the canal* as compared with being in the reservoir for which the Reclamation Service makes provision of 2 acre feet per acre.

It appears by the latest report of the Reclamation Service that the Indian Reservation ditch, of date 1901, has been awarded a priority of appropriation over all ditches in the stream, in the amount of 125 second feet, the decision being based on the terms of a treaty with the Indians. The decision has been affirmed by one Appellate Court and is now before the Supreme Court of the United States and that, pending a decision from the Court, the adjudication of all other appropriations has been postponed.

In addition to these appropriations aggregating 359 second feet, there are others diverting water from tributaries as follows:—

Canal.	First used.	Capacity Measured.	Capacity Claimed.	Area Irrigated.	Total Discharge.
		s. f.	s. f.	acres.	s. f.
Cook	1895	50	75	1,700	4,628
Matheson	1892	28	125	2,715	2,575
West Fork	1899	13	100	800	.....
Reser	1900	8	50	240	.....
Rock Creek	1904	48	120	.....	.....

The same discrepancy between actual and claimed capacity is noticeable, as is the reduced duty of water.

These ditches, being supplied by tributaries may not affect any relation between the two countries in the use of Milk river water, unless their location be such as to adversely affect the supply of water to a ditch in the main stream and this feature should also be investigated.

The strictly commercial aspect of the situation has now to be considered.

It must be evident that the United States have concluded after years of investigation, that the only feasible proposition for the diversion of the St. Mary waters and their application to lands in the Lower Milk river valley is by way of the Milk river channel in Canada.

It was early demonstrated that the all-American route across country just south of the international boundary involved a prohibitive expenditure, estimated at \$4,600,000 on very insufficient data and by somewhat primitive methods.

The cost of the canal route by way of the Marias river has evidently not been estimated, largely, doubtless, because even the most superficial investigation shows that it also is prohibitive and its evident abandonment and the abandonment of the St. Mary project itself, would seem to be plainly foreshadowed in this statement of the consulting engineer's report, (Third Annual Report, page 307):—

It appears probable that if the Canadian government does not make satisfactory guarantee to justify the construction of the St. Mary reservoir and canals, the Marias drainage basin (by itself) can be made to serve all available land in Milk River valley.

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Elsewhere in this review, it has been shown that the effort to connect the St. Mary basin and the Lower Milk river valley by the Marias route will involve an expenditure of anywhere from three to five millions of dollars.

In the last resort, there will be, according to the declaration of the Sixth Annual Report, the reclamation of 100,000 acres of land on the Blackfoot Indian Reservation and though the Reclamation Service officials have not submitted estimates on the cost of that enterprise—have apparently not even made more than the most general preliminary surveys,—it has been shown, conservatively, that this project will involve the expenditure of between $3\frac{1}{2}$ and 4 millions of dollars.

All these considerations do not bear out, indeed they question the reliability of the statement of the Reclamation Service officials to Messrs. Galt and Magrath, June, 1905, that 'in short, by expenditure of say \$20 to \$25 per acre of land reclaimed the principal part of the water supply can be kept within the United States.'

On the contrary, it must be very apparent that between the point where the St. Mary diversion canal reaches the North Fork of the Milk river, and the point where the water would again be diverted in the Lower Milk river valley, there is a gap which will cost the United States, by any other route than through the bed of the Milk river, between 3 and 5 millions of dollars to span. That, in other words, is the least amount the United States would expend if it is not allowed to use the channel of the Milk river, and, as the Reclamation Service officials expressed it in the interview in June, 1905, already referred to:

The critical question for the United States is whether any economy of construction would justify giving up any considerable amount of water which might be used in future development of the arid lands.

The proposal outlined shows that in years of mean flow Canada would receive 601,861 acre feet as its share of the waters of the combined streams. Not all of that is what the United States would 'give up' for the privilege of securing transportation of its waters through the channel of Milk river. It has already been pointed out that the United States concedes and recognizes the prior appropriations of Canada, as of date November 1, 1905, up to 310 second feet against the St. Mary river and 330 second feet against the Milk river. That limitation will be disputed, as considered elsewhere, for the present, the amounts may be assumed.

The proposal contemplates that Canada shall not divert water from the St. Mary during the winter season, November to March, inclusive. There is nothing, however, to prevent Canada making diversion throughout the whole year, there is nothing in the grant from the Canadian government to the Alberta Irrigation Company limiting its use of the water granted to any period of the year, irrigation season or otherwise, and so far as this immediate consideration is affected, Canada would have the prior right to the flow of at least 310 second feet throughout the whole year which would amount to 226,300 acre feet. And reference to the table of flow of the St. Mary river will show that the mean flow of the stream yields 310 second feet or more in every month of the year.

The proposal limits the diversion from the Milk river to the four months April to July, inclusive, in the amount of 330 second feet, and to that amount and for that period Canada would have an undisputed right, conceding to the United States the prior right of diversion for about 350 second feet. The table of mean flows will show that both these amounts can be fairly relied on from Milk river in these four months of April to July. And 330 second feet in that period would amount to 80,520 acre feet.

These two amounts total 306,820 acre feet against the total diversion from both streams by Canada, under this proposal, of 601,681 acre feet, leaving a balance of 294,861 acre feet which, in the extreme event, is the maximum which the United States might claim it would be paying for the privilege of using the Milk river channel.

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It may be conceded that the amount of 330 second feet of diversion from Milk river is the maximum which Canada could claim at this time, and it may also be conceded that, in normal years, that amount could be secured by Canada only in the months from April to July, inclusive, and even rarely in July as the tables of flow will show.

But the position of the St. Mary river is altogether different. Elsewhere, consideration is had of the position the grant to the Alberta Irrigation Company occupies as against the stream. It is contended that Canada cannot be limited in its rights to divert water from the St. Mary river, to the amount of water being used for beneficial purposes upon any particular day, least of all November 1, 1905. The canal of the Alberta Railway and Irrigation Company has at this time a capacity of at least 800 second feet and by gradual extension and enlargement within its charter can beneficially serve an area of 210,000 acres requiring at least 1,400 second feet capacity.

In the former case, of 800 second feet, Canada would be entitled by the present capacity of the constructed canal to all of the mean flow of the St. Mary river in the months of January, February, March April, September, October, November and December and to 800 second feet in the remaining months of the year which would amount to 435,177 acre feet to which would have to be added the amount secured from Milk river, 80,520 acre feet, making a total of 515,697 acre feet, as compared with 601,861 acre feet. That is to say, the United States would give 86,164 acre feet as the price of securing transportation through the Milk river channel.

On the contention that Canada has a right to 1,400 second feet through the canal of the Alberta Railway and Irrigation Company it would be entitled to all of the mean flow of the St. Mary river in every month of the year excepting only May, June and July and to 1,400 second feet in these months. That would amount to 559,440 acre feet, to which would be added the amount secured from Milk river of 80,520 acre feet, a total of 639,960 acre feet, as compared with 601,861 acre feet. That is to say, that upon the strongest and yet reasonable claim of its prior appropriations, Canada would be conceding 38,099 acre feet to the United States in this matter of the equitable division and use of water of the St. Mary river to accommodate her neighbour on the southern boundary.

On Canada's least claim, the United States would concede or pay 294,861 acre feet as the price of entry. What is the right to that body of water worth?

At the present time in Colorado, where the conservation of all available waters has reached a high stage of development, an acre foot of water is valued at from \$20 to \$40, ranging with location, the character of crops that can be produced and the assurance of the water supply. That price includes the cost of construction of reservoirs and the actual ownership of these reservoirs and the transporting canals, &c.

Lower Milk river project (Page 111):—

Value of irrigated land.. . . .	\$40 per acre.
Duty of water.. . . .	2 acre feet per annum.

Marias project (Page 119):—

Value of irrigated land.. . . .	\$40 per acre.
Duty of water.. . . .	2 acre feet per annum.

Sun river project (Page 121):—

Value of irrigated land.. . . .	\$40 to \$200 per acre.
Duty of water.. . . .	1½ acre feet per annum.

Huntley project (Page 101):—

Value of irrigated land.. . . .	\$50 to \$100 per acre.
Duty of water.. . . .	2½ acre feet per annum.

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It is accepted as an axiom in irrigated districts that the value of the water, or water right, is one-half of the value of the irrigated land. Applying this to the figures given above, the value of an acre foot is found to range from \$10 to \$66.66, the latter high figure in connection with the Sun river project where the higher value of irrigation lands is doubtless due to the proximity of some of these lands to populous centres like Great Falls. On the Lower Milk river and Marias projects, the value of the acre foot is ascertained to be \$10.

On that value, the price to be paid by the United States, on the present proposal, 294,861 acre feet would represent \$2,948,610 in cash, or in round numbers \$3,000,000.

It will be noted, of course, that in years of stream flow above normal, such as 1903, Canada's share would be above the figures quoted, would be in fact, as shown in table, 207,309 acre feet above that amount, (808,990 acre feet as compared with 601,681 acre feet) or in such a season it might be said the United States was paying \$2,073,090 more, or \$5,021,700 in all, capitalized value for this privilege. On the other hand, there would be years below the normal flow, and in all the years, both countries would share equally in the deficiency or excess of water available for irrigation purposes and it may be stated in general terms that the United States would be paying from \$3,000,000 to \$5,000,000 for the privileges required.

It is very clear from examination of the various plans investigated by the Reclamation Service officials that the United States cannot by any other method, connect the St. Mary basin with the lands of the Lower Milk river valley, at a lower figure.

The proposal has to be considered also from the relative amounts of water secured to each country. It will be observed that in years of maximum flow, the United States will secure 2.40 acre feet per acre per annum, and in years of mean flow, 1.35 acre feet per acre per annum. The first is in excess of the duty established by the Reclamation Service of 2 acre feet per annum. Indeed, the average secured by the United States will be greater than shown, as the area actually irrigable is 215,000 acres in place of 250,000 acres, yielding 2.81 acre feet in maximum years and 1.58 acre feet in years of mean flow.

On the other hand, Canada secures but 1.28 acre feet in years of maximum flow and .95 acre feet in years of mean flow for the area available for irrigation within its territory which is nearly three times as great as that within the United States.

The following tables are attached hereto for reference:—

Table A. Flow of the St. Mary river, at the International line, for years 1902-1906, inclusive, taken from the various reports of the United States authorities.

Table B. Flow of the Milk river at Havre, Montana, for the years 1898-1906, inclusive, taken from the various reports of the United States authorities.

Table C. Mean flow of the St. Mary river, at the International line, developed from Table A, showing the share of the waters between Canada and the United States on the basis of Canada's proposal.

Table D. Mean flow of the Milk river, at Havre, Montana, developed from B, showing the share of the waters between Canada and the United States on the basis of Canada's proposal.

Table E. Combination of the mean flows of the St. Mary and Milk rivers, developed from tables C and D showing the share of the waters of both streams between Canada and the United States, on the basis of Canada's proposal.

Table F. Combination of the flow of the St. Mary and Milk rivers, in 1903, a year of maximum flow, developed from Tables A and B, showing the share of the waters of both streams, in a season of maximum flow, between Canada and the United States on the basis of Canada's proposal.

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Notes.—Regarding Table A, there are many reasons to doubt its accuracy. The very high flows during the months of January, February and March of 1903, seem to be out of all proportion, even knowing that the preceding year of 1902 was one of phenomenally high flow in the stream. That high flow did not, however, continue after the month of August.

On the other hand, the items of maximum flow in 1903 show the peak of the high water to be about 7,000 cubic feet per second. In 1904, measurements were made of floods marks extremely well defined, about one mile north of the boundary, which on careful and conservative calculations, developed a discharge of over 50,000 cubic feet per second. That quantity does not seem to the writer to be exaggerated in his memory of the enormous floods that passed the intake of the Alberta railway and Irrigation Company's canal in 1902.

Again, analysis of the records of flow reported by the United States Reclamation Service reveals serious discrepancies, particularly in the years of 1904 and 1905, when the recorded flows of the St. Mary river and Swift Current creek at the St. Mary Reservoir site in Montana are, together, in excess of the recorded flow at the International line in the months of June, July, August, September, October and November in 1904, and the flows of these streams and Kennedy creek also are in excess of the flow at the international line in April, June, July, August, September and November in 1905.

In 1905 the Alberta Railway and Irrigation Company maintained a gauging station at the intake of their canal, and the records obtained from it show that the flows recorded by the U. S. Reclamation Service at the boundary in that year are in excess of the Alberta measurements in May, June, July and October. During October the U. S. measurements showed 47,470 acre feet at the International line, the Canadian measurements 9,213 acre feet.

In 1906, the records at the International line are in excess of the records of the Canadian Canal in the months of May, July and August, in the percentage of 8. 11 and 24.

In 1907, the Canadian records show a very high river throughout the season, being in excess of the U.S. records for 1903 during the months of June, July, August and September, the total yield of the stream from June to October, inclusive, in 1907 exceeding the yield in those months in 1903 by over 55,000 acre feet.

It should also be noted that during the years from 1898 to 1901, inclusive, during portions of the year the Alberta Railway and Irrigation Company maintained a hydrograph station near their intake and from these it is developed that the normal flow in these four years was 724,400 acre feet as compared with the normal flow of 712,701 acre feet at the International line, in the years from 1902-1906. With that record and the record of 1907, it is evident that a slightly greater normal flow would be available than has been considered.

Regarding Table B of Milk river discharges it has been accepted wholly from United States records. Save in the year 1904, Canadian measurements are few and isolated.

The serious falling off in the stream after July is specially worthy of notice—there is no flow for instance from August, 1905, to March, 1906. After mid-July and throughout August, 1904, the flow of the stream at the intake of the Canadian canal averaged less than 35 second feet, while the average flows at Havre in that year, after July were, as follows:—August, 5 second feet, September, 3 second feet, October, 19 second feet, November, 35 second feet, December, 25 second feet. Tables C, D, E and F are self explanatory.

TABLE A.
ST. MARY RIVER, NEAR CARDSTON, ALBERTA, 1902-1906.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1902									35,940	29,330	20,350	67,144	
1903	52,572 ^a	50,705 ^a	78,028 ^a	63,550	105,759	309,421	179,790	86,329	65,990	56,384	31,835	26,931	1,107,294
1904	13,773 ^a	11,504 ^b	12,298 ^b	55,636 ^c	124,328	166,255	114,367	57,245	24,992	13,097	7,260 ^b	7,654 ^b	610,409
1905	5,534	4,165	10,510	17,550	74,710	146,500	101,000	52,080	22,080	47,470	17,730	14,760 ^a	514,100
1906—W.S. 207	6,150	5,280	7,690	28,600	92,200	136,000	113,000	58,200	37,400	46,500	65,500	22,100	619,000
Mean in acre feet...	19,507	17,913	27,132	41,334	99,249	189,544	127,039	63,463	37,280	38,556	28,535	23,118	712,701
Mean in sec. feet...	314.6	319.9	437.6	688.9	1600.8	3159.0	2049.0	1023.6	621.3	621.9	475.6	453.5	...

a—Approximated.
b—Estimated from gauge heights.
c—"
d—"

TABLE B.
DISCHARGE OF MILK RIVER AT HAVRE, MONTANA (IN ACRE FEET).

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1898.....					85,837 <i>d</i>	80,568	10,330	6,948	3,154	5,411	5,950 <i>e</i>	6,948
1899.....	26,440 <i>a</i>	33,322 <i>c</i>	30,744 <i>a</i>	81,223	61,857	55,934 <i>d</i>	14,818 <i>a</i>	12,052 <i>d</i>	7,795	57,798	11,306 <i>d</i>	9,223 <i>d</i>
1900.....	6,149 <i>a</i>	5,554 <i>a</i>	9,223 <i>a</i>	23,445 <i>b</i>	26,717	9,164	2,644	2,460	4,522	11,437	6,783 <i>c</i>	3,074 <i>a</i>
1901.....	3,074 <i>a</i>	5,554 <i>a</i>	36,893 <i>a</i>	12,198	39,841	32,906	11,314	1,722	3,332	5,042	4,760	6,149 <i>d</i>
1902.....	11,068	11,552 <i>a</i>	15,310	11,663	66,714	88,007	125,742	23,181	17,673	18,999	17,851 <i>a</i>	18,466 <i>d</i>
1903.....	12,298 <i>g</i>	11,107 <i>g</i>	14,757 <i>g</i>	59,266	66,344	58,015	27,362	23,242	9,579	8,485	6,843 <i>g</i>	9,038 <i>g</i>
1904.....	5,534 <i>a</i>	4,314 <i>a</i>	4,612 <i>a</i>	103,299	22,935	16,542	2,705	307	178	1,168	2,083	1,537 <i>a</i>
1905.....	307 <i>a</i>	278 <i>a</i>	2,460 <i>a</i>	3,511	3,812	2,083	3,320	1,290				
1906.....			1,290	5,630	7,320	55,600	6,210	320	167	92	30 <i>f</i>	
Mean in acre-feet.....	9,267	10,210	14,411	37,529	42,379	44,313	22,716	7,947	5,822	13,554	6,951	7,777
Mean in sec. feet.....	149.5	182.9	232.4	625.5	683.5	738.5	366.4	128.2	97	218.6	115.9	125.4

(—Approximated.

^b—Estimated from gauge heights, April 10-30, 1900.

1	"	November 1-15, 1900.
2	"	"
3	"	"
4	"	"
5	"	"
6	"	"
7	"	"
8	"	"
9	"	"
10	"	"
11	"	"
12	"	"
13	"	"
14	"	"
15	"	"
16	"	"
17	"	"
18	"	"
19	"	"
20	"	"
21	"	"
22	"	"
23	"	"
24	"	"
25	"	"
26	"	"
27	"	"
28	"	"
29	"	"
30	"	"
31	"	"

d—	" "	May 15-31, 1896.
—	" "	November 1-19

f.—No flow after November 16th.

q—Estimated.

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TABLE C.

ST. MARY RIVER.

Mean flows, from United States Reclamation Service Records, near Cardston, Alberta:—

		Canada.	United States.	Flood Water to be Divided Equally.
January	19,507	.....	19,507	.....
February ..	17,918	.....	17,918	.....
March.....	27,132	.....	27,132	.....
April.....	41,334	41,334	.....	.....
May.....	99,249	49,624 44,800	.....	4,285
June.....	189,544	84,000	.....	105,544
July.....	127,039	86,800	.....	40,239
August ...	63,463	63,463	.....	.....
September..	37,280	37,280	.....	.....
October ..	38,556	38,556	.....	.....
November.....	28,535	.....	28,535	.....
December ..	28,118	.....	28,118	.....
Acre feet	717,675	445,875	121,210	150,608
Flood waters....	.....	75,304	75,304	-
		521,179	196,514	

Canada's share would provide 210,000 acres with 1½ acre feet—315,000 acre feet—and would fill:—

Acre feet.	
Lumpy Butte	12,473
Chin Coulee ..	50,000
Mary Lake ..	21,658
Taylorville...	42,836
Shanks Lake	79,212 out of 109,347 acre feet.
206,179	

Leaving Shanks lake 30,135 acre feet, to be filled in years of extreme floods as 1902, 1903, 1907.

TABLE D.

MILK RIVER.

Mean flows, from United States Reclamation Service Records, at Havre, Montana:—

	Acre feet.	Canada. Acre feet.	United States. Acre feet.
January.....	9,267		9,267
February.....	10,240		10,240
March.....	14,411		14,411
April.....	37,529	19,800	17,729
May.....	42,379	20,460	21,919
June.....	44,313	19,800	24,513
July.....	22,716	20,460	2,256
August.....	7,947		7,947
September.....	5,822		5,822
October.....	13,554		13,554
November.....	6,951		6,951
December.....	7,777		7,777
	222,906	80,520	142,386

Canada's share would fill:

	Acre feet.
Milk River Reservoir.....	29,000
Raymond Reservoir.....	7,575
Brunton Reservoir.....	43,945
	80,520

Leaving:

	Acre feet.
Brunton Reservoir.....	23,055
Verdigris Reservoir.....	150,000
	173,055

to be filled in years of extreme flood, as in 1899, 1902, 1903, 1907—four years out of nine recorded.

TABLE E.

COMBINATION OF ST. MARY RIVER AND MILK RIVER.

Mean Flows from United States Reclamation Service Records at Cardston, Alta., and Havre, Montana.

	Acre feet.	Canada's share.	United States share.
		Acre feet.	Acre feet.
January.	28,774		28,774
February .. .	28,158		28,158
March.....	41,543		41,543
April	78,863	61,134	17,729
May.....	141,628	117,296·5	24,331·5
June.....	233,857	156,572	77,285
July.....	149,755	127,379·5	22,375·5
August.....	71,410	63,463	7,947
September.....	43,102	37,280	5,822
October.....	52,110	38,556	13,554
November.....	35,486		35,486
December.....	35,895		35,895
	940,581	601,681	338,900

Canada's available irrigable area 630,000 acres.
would secure.....·95 acre ft. per acre.
United States.....250,000 acres.
would secure.....1·35 acre ft. per acre.

TABLE F.

COMBINATION OF ST. MARY RIVER AND MILK RIVER IN 1903.

From United States Reclamation Service Records at Cardston, Alta. and Havre Montana.

Showing division on basis of Canada getting 1,400 second feet from St. Mary River from April-October and one-half surplus. And from Milk River 330 second feet from May-July and one-half surplus.

—	St. Mary.	Milk River.	Total.	Canada's share.	United States share.
	Acre feet.	Acre feet.	Acre feet.	Acre feet.	Acre feet.
January.....	52,572	12,298	64,870	.....	64,870
February	50,705	11,107	61,812	.....	61,812
March.....	78,028	14,757	92,785	.....	92,785
April.....	63,550	59,266	122,816	92,583	30,233
May.....	105,759	66,344	172,103	128,832	43,271
June.....	309,421	58,015	337,436	225,117	142,319
July.....	179,790	27,362	207,152	153,755	53,397
August.....	86,329	23,242	109,571	86,329	23,242
September.....	65,990	9,759	75,749	65,990	9,759
October	56,384	8,485	64,869	56,384	8,485
November.....	31,835	6,843	38,678	.....	38,678
December	26,931	9,038	35,969	.....	35,969
Total	1,107,294	306,516	1,413,810	808,990	604,820

Canada's available irrigable area, 630,000 acres,
would secure 1·28 acre feet per acre.
United States available irrigable area, 250,000 acres,
would secure 2·40 acre feet per acre.
United States would fill St. Mary Reservoir 150,000 acre ft. capacity.
and Chain Lake Reservoir 437,500 "
587,500 acre ft.
with 17,320 acre feet surplus.

Canada would supply 210,000 acres with 1½ ac. ft. per ac.=315,000 ac. ft.
and would fill Lumpy Butte Reservoir 12,473 acre feet.
Chin Coulee " 50,000 "
Mary Lake " 21,658 "
Taylorville " 42,836 "
Shanks Lake " 109,347 "
Milk River " 29,000 "
Raymond " 7,575 "
Brunton " 67,000 "
Verdigris " 150,000 "
489,889·5
804,889·5
with 4,100·5 acre feet surplus.

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One important proposition, important to Canada's interest, must not be overlooked in the final arrangement of any agreement with the United States.

For the full development of the plans involved in the most extensive reclamation of areas in Canada, it will be necessary to divert water from St. Mary river to Milk river partly to divert the direct flow of the former stream for direct and immediate use upon the lands tributary to the latter stream, but mainly to divert water for storage and mostly in the Shanks Lake reservoir, a very large basin with capacity in excess of 100,000 acre feet.

A thoroughly practicable route exists through Whisky Gap, and this route was carefully surveyed in 1904. The best line through the Gap would head about 3 miles south of the International boundary in the United States, and would again deflect into United States territory in the Willow Creek drainage for a total distance of $4\frac{1}{2}$ miles.

It is possible to keep this canal wholly within Canadian territory by the construction of a high diversion dam in the bed of the St. Mary river, which would throw back water into United States territory in any event, and by the construction of a high flume or siphon across the Willow Creek drainage just north of the International boundary.

From the engineering standpoint, this route is an admirable one and free from any construction difficulties. It would be about 23 miles long and the greatest depth of cutting would be 27.4 feet, and the greatest fill 35.3 feet and these could probably be reduced by locating the intake further up the river.

It is, in every sense, a much superior route to that now selected by the United States officials and might be submitted to them for adoption in the event of agreement being reached upon the division of waters.

It was brought to their attention early in 1905, and reference is made to it in the Fourth Annual Report, pages 180-181:—

A possible canal line from the St. Mary river, located partly in the United States and partly in Canada that might be less costly than the all-American Canal. Preliminary surveys of this international canal were made in 1905 * * * * *. The total length of the canal line is 23 miles. Preliminary estimates show that the canal would be *somewhat cheaper* of construction than the upper line, and the annual maintenance would also probably be less.

My own estimates, on very generous allowance of quantities and of unit prices—25 cents per cubic yard for earth, as compared with $22\frac{1}{4}$ cents per cubic yard of the bid rejected by the United States officials for the St. Mary canal as too high, indicated that a canal of a capacity of 2,000 second feet, in place of 850 second feet, could be constructed for less than one million dollars.

This important proposition should be held in reserve, it is possible, as suggested, that Canada might desire to obtain a right of way for portions of the Canal within the territory of the United States. On the other hand, it might be possible to acquire such right of way by the purchase of areas in individual ownership, though as the territory through which it would pass is within the limits of the Blackfeet Indian Reservation, it would seem likely that, to secure such individual ownership, the permit of the Indian Department would be required.

But no agreement with the United States at this time will be complete that does not, at least, make some preliminary arrangements for such right of way, should Canada desire to obtain it at some future time.

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DEPARTMENT OF STATE,
WASHINGTON, June 15, 1907.

EXCELLENCY,—With a view to bringing to a determination the question so long discussed relating to the use of the waters of the St. Mary river and the Milk river, which flow across the 49th parallel boundary between the United States and Canada, I beg to offer the following suggestions for a basis of a treaty for the equitable apportionment of those waters.

It is hereby agreed between the governments of Great Britain and the United States that the waters of the Milk river and the St. Mary river and their tributaries shall be apportioned in perpetuity for use in the two countries according to the following stipulations and agreements:—

1. That for the purpose of this agreement the St. Mary river and the Milk river and their tributaries which are now separate and independent river systems shall be treated as though they were the waterways of a single drainage system.

2. That the water available for irrigation from these two river systems throughout the period from March 1st to September 30th of each year, both dates included, shall be apportioned to each of the two countries from day to day in equal amounts.

3. That the failure of either country to fully utilize the right hereby agreed upon to one-half of the available water, during the period specified in paragraph 2, shall not be regarded as adding to or diminishing the rights of the other country.

4. That the period in each year not specified in paragraph 2, the United States may divert or hold back in storage reservoirs any portion of the natural flow of St. Mary river; and Canada may divert any portion of the natural flow of Milk river (in neither case to interfere with existing rights).

5. That the apportionment of water hereby agreed upon during the period specified in paragraph 2 shall be determined in the following manner: The share to which the United States is entitled shall be the total of the following items:—

(a.) All water of the St. Mary river and its tributaries diverted in the United States for use in its territory and not delivered into Milk river or its tributaries.

(b.) All water of Milk river and its tributaries diverted in the United States for use in its territory, above the crossing of such streams into Canada.

(c.) All water of Milk river (including stored water of the St. Mary river turned into it) not in excess of 2,000 cubic feet per second flowing into the United States at the eastern Milk river crossing of the International boundary.

The share to which Canada is entitled shall be the total of the following items:—

(d.) All water of St. Mary river crossing the International boundary into Canada not in excess of 2,000 cubic feet per second.

(e.) All water of Milk river and its tributaries diverted in Canada for use in its territory including any water of St. Mary river turned into Milk river by Canada and which has been measured under item 'd.'

6. The total quantity of water to which each country shall be entitled according to the items enumerated in paragraph 5, shall be maintained at equal amounts as nearly as may be possible from day to day during the period specified in paragraph 2, under such regulations as shall be agreed upon by the commission provided for in paragraph 14.

7. The amounts of water chargeable to each country under the several items enumerated in paragraph 5 shall include all the water of the two river systems whether used directly or indirectly by the two governments or by private parties in their respective territories.

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8. That Canada shall in no event divert from the Milk river any portion of the stored St. Mary river water turned into the Milk river system by the United States, due allowance being made for losses by evaporation or seepage, while passing through the channels of the Milk river system as fixed by the commission provided for in paragraph 14.

9. The share of the United States shall in any event include so much of the available natural flow of the Milk river as shall be judicially determined as having been applied to beneficial use on or before November 1, 1905, by the canal systems taking water from the Lower Milk river in Montana, the same to be measured at the intakes of said canal systems, and whenever one-half of the natural flow of the Milk river shall be less than such amount measured as aforesaid, the share of Canada shall be diminished so that said country shall receive of the natural flow of the entire Milk river system only the excess, if any, beyond such amount of the decreed beneficial use. It is understood that the amount of water heretofore diverted for beneficial use from Lower Milk river in Montana as being in excess of 350 cubic feet per second, when the same was available.

10. The share of Canada shall in any event include so much of the available natural flow of St. Mary river as has been applied to beneficial use on or before November 1, 1905, by the canal taking from St. Mary river in Canada, the same to be measured at the intake of the said canal; and whenever one-half of the natural flow of St. Mary river shall be less than such amount, measured as aforesaid, the share of the United States shall be diminished so that the said country shall receive of the natural flow of the entire St. Mary river system only the excess, if any, beyond such amount. It is understood that the greatest amount of water diverted from St. Mary river in Canada as shown by measurement has not been in excess of 310 cubic feet per second.

11. The term (natural flow), as used herein is to be understood as the flow of the river system in question which would pass the point or points specified if no artificial structure had been placed in the stream channel and if no water had been diverted from or turned into it. Such natural flow shall be determined by the commission provided for in paragraph 14.

12. That this agreement for the diversion of the waters of the Milk and St. Mary river systems shall be regarded as a full settlement of all existing and future claims of both countries to these waters.

13. That the United States shall not be liable for damages of any kind resulting from high water stages or floods of Milk river, whether at times when water from St. Mary river is being carried in Milk river or not.

14. That the diversion of the waters herein agreed upon shall be done under the supervision of the commission, one member to be appointed by the president of the United States, one member to be appointed by the Governor General of Canada. This commission shall have supervision over the measurement and distribution of the water and shall be empowered to make appropriate rules and regulations to carry into effect the provisions of this agreement. In all cases of a failure on the part of this commission to agree upon any matters which it is authorized to decide, the members shall be empowered to select a third member and for the purposes of deciding the points of disagreement the commission shall consist of the three said members.

Those suggestions have been prepared by the officers of the Reclamation of Irrigation Service of the United States, and I trust that they may serve as a basis upon which we may bring this matter to an early conclusion satisfactory to both Canada and the United States.

I have, &c.,

ELIHU ROOT.

SESSIONAL PAPER No. 19e

INTERNATIONAL WATERWAYS TREATY—ADDITIONAL
CORRESPONDENCE.

DEPARTMENT OF THE INTERIOR,
DOMINION ASTRONOMICAL OBSERVATORY,
OTTAWA, CANADA, November 15, 1909.

MEMORANDUM.

In considering the effect of Article 6 of the Waterways Treaty upon irrigation interests in Canada, a question of interpretation presents itself with regard to the most vital point of all, the amount of water which Canada should receive.

The share of Canada is one-half the aggregate flow of St. Mary's and Milk rivers and their tributaries. The question is where the rivers are to be measured for the purpose of the determination of the total which is to be divided. This is not directly stated in the Treaty.

The point is of little consequence so far as regards St. Mary river because the great bulk of its water is derived from one source and the course of the river on either side of the boundary line is short.

The case of Milk river is different, and measurements at different places will give very different results, according as more or less of the river is taken into account.

Milk river has a short course from its head waters in Montana to the boundary, it flows for about 110 miles in Canada, and then crosses into Montana again, and continues in that State till it falls into the Missouri, some 300 miles below the last crossing of the boundary.

Hitherto calculations (as Mr. Anderson's) of the share of Canada in Milk river waters have been based upon measurements at Havre, Montana, which is some 60 miles below the point where the stream leaves Canada. (Havre records have been used because there are no regular records above that point).

The draft treaty of the State Department in 1907 proposed the eastern crossing of Milk river by the boundary line as a determining point.

By providing that the United States should take all the water in excess of a certain amount passing that point, it terminated the Milk river there, for the purpose of the treaty. Canada would have had no concern with what happened further down the river. The present treaty does not contain a similar provision.

It provides that Milk river and its tributaries in Montana, Alberta and Saskatchewan shall form one stream with St. Mary's river and its tributaries, and Canada's share shall be one-half of the aggregate water.

I submit that the effect of this is to include for the purpose of determining the amount of Canada's share all the water which shall be in the whole Milk river from its source to the Missouri although for the 300 miles of the lower part of its course, Canada is physically unable to take any water from it, Canada's share of this water would frequently be in excess of the flow within her own territory and she would be entitled to take the balance of her share from St. Mary's river.

There are no figures available as to the size of Milk river at its mouth, but it is certainly much larger there than at the boundary line, at least, in certain months, for between the two points it receives several tributaries from the Cypress Hills and

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Wood Mountain, as well as tributaries from the south which drain the greatest part of Bear's Paw and Little Rocky Mountains, important sources during the early summer.

In the later summer and fall, Milk river near its mouth is probably nearly dry, as it is along its whole course, but the annual aggregate at its mouth is undoubtedly much greater than at the boundary line.

The foregoing is based upon the fact that the treaty uses the word Milk river without any limitation, and therefore the whole Milk river is meant. The Milk river, in Montana is spoken of as well as the Milk river in Canada.

Furthermore it is the Milk river and its tributaries in Montana; Alberta and Saskatchewan, Saskatchewan is expressly mentioned.

The Milk river itself never touches the province of Saskatchewan; it crosses the southern boundary of Alberta some twenty-five miles west of the Saskatchewan-Alberta line.

The reason Saskatchewan is mentioned is that several of the tributaries of Milk river rise in Saskatchewan or, rising in Alberta, flow into Saskatchewan. These flow across the line to Montana and fall into Milk river below the crossing of the boundary line. The most easterly of them falls into Milk river about 50 miles above its mouth, or two hundred and fifty miles below the boundary.

It should be noted that the proposed irrigation works of the United States extend along Milk river further down than this point, namely to Glasgow, some twenty miles only above the mouth of the river.

If we were to limit the Milk river for the purposes of the treaty to the part above the eastern crossing of the boundary line, we should cut out all these Saskatchewan tributaries, which the treaty expressly declares shall form part of the 'one stream.'

If 'Milk river' means only Milk river above the boundary, there is no provision in the treaty for dealing with these at all. The treaty is of no effect with regard to them, and the word 'Saskatchewan' in the treaty means nothing.

Hence if the Milk river of the treaty does not extend to the actual mouth of the river, it at least extends to the point where the most easterly Canadian tributary comes in.

It may be objected to this that it clashes with the provisions for the prior right of the United States to 500 second feet or three-fourths of the river. For a treaty is to be read, when its words are not explicit enough, by the intention of its framers, and it is well known that the intention of the priority was to secure certain private users of water, living in the valley of Milk river a long way above its mouth. To give them their prior supply at the mouth of the river would be absurd. However, the provision as to the priority has reference merely to a certain detail of distribution of the share of the United States and has nothing to do with the amount of the share. If Canada is prevented from getting her full share of Milk river at certain times, she takes the balance from St. Mary's river.

Respectfully submitted,

(Sgd.) W. F. KING.

Hon. WILLIAM PUGSLEY,

Minister of Public Works,
City.

From Mr. Bryce to Lord Grey.

WASHINGTON, December 15, 1909.

My LORD.—I have the honour to inform you that Mr. Chandler Anderson of the State Department called upon me yesterday with respect to the points discussed with that Department by Mr. Pugsley and myself upon the instant. Mr. Anderson

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stated to me at some length the views of the United States Government upon the several questions of the St. Mary and Milk rivers, the Rainy river and the St. John river, but as he promised to embody these views in a letter which should set them out fully, and which should reach me very soon, it seems better that I should await their complete and authoritative statement in that letter rather than to convey them to you in a less perfect form.

I may however say that he gave me to understand:

(1) that the United States government intend to construct the reservoir on the upper waters of the St. Mary's river which Your Excellency's government desire, and which is, they say, really needed in the interests of their own irrigation projects;

(2) that while the United States government are considering, with care and deliberation, how best to deal with the Rainy river question, they recognize the importance of securing a due supply of water for the purpose of navigation in that stream, and

(3) that they see no objection to enlarging the reference to the Commissioners who are dealing with the question of the St. John river so as to enable them to inquire as to the feasibility and utility of a plan for improving the water flow by water storage.

I have, &c.,

(Sgd.) JAMES BRYCE.

The Right Honourable
The EARL GREY, G.C.M.G.,
Governor General.

From His Majesty's Ambassador at Washington to the Governor General.

From Mr. Bryce to Lord Grey.

BRITISH EMBASSY,
WASHINGTON, January 4, 1910.

My LORD,—I have the honour to enclose herewith a copy of a letter which I have just received from the Secretary of State conveying the reply of the United States government to the communications made to them by the Honourable Mr. Pugsley, Your Excellency's Minister of Public Works, and myself on the eleventh of December last.

It will be seen from this letter, and from the letter enclosed in it from the United States Secretary of the Interior that the United States government have not only fully and definitely determined to carry out and construct at St. Mary's lake on the upper course of the St. Mary's river the dam and reservoir which your ministers conceive to be necessary for securing a supply of water for irrigation purposes during the dry season in the Milk river, but have been and still are at work on the construction of a canal to carry the water from that reservoir to the Milk river, such canal being, as they observe, useless except for the purpose of feeding the Milk river from the aforesaid reservoir. The State Department have informed me privately that this reservoir will be of very large dimensions and they observe that it is absolutely necessary for the purposes of their own irrigation works on the lower course of the Milk river after it has left Canada to enter United States territory. They propose, as Your Excellency will observe, to push on the work of building the dam also as soon as the Treaty goes into effect.

As respects the Rainy river it will be observed that the United States government declare themselves equally resolved to secure a due supply of water in that stream for the purposes of navigation, and that they have told the Minnesota Canal and Power Company that if the latter proceed with their project they will be required to construct works sufficient to secure that due supply. It seems at present to be

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doubtful whether the project will be proceeded with. But the United States government conceive themselves bound (if it should go further) to see that the interests of Navigation, which are common to both countries, are fully provided for and they appear indeed to be bound by law to do so.

As respects the St. John river, the United States government accede to the proposal made by Mr. Pugsley and myself that the question of the desirability of constructing storage works on the upper courses of that stream to secure a better supply of water for floating logs down it should be referred to the commission now sitting, for examination and report, and they are prepared so to instruct the United States members of the commission.

I have, &c.,

(Sgd.) JAMES BRYCE.

DEPARTMENT OF STATE,
WASHINGTON, January 3, 1910.

EXCELLENCY,—Referring to your recent inquiry in regard to the plans of the United States Reclamation Service with reference to the construction of a dam in the St. Mary lake in northern Montana, which was contemplated in connection with the apportionment of the waters of the St. Mary river and Milk river between the United States and Canada, under Article VI. of the Treaty between the United States and Great Britain signed on January 11th last, I have the honour to enclose herewith for your information a copy of a letter written to me on the 3rd instant by the Secretary of the Interior stating the plans of the Reclamation Service in response to a request for the information asked for by you.

It appears from this letter that the plans of the Reclamation Service in regard to this dam have not been changed since the pending treaty was signed, and that considerable preliminary construction work has already been done towards carrying out these plans, and that material is now being accumulated and work is still being carried on in preparation for the construction of the proposed dam; but that it is regarded as unwise to begin the actual construction of the dam pending the ratification of the treaty, although it is the intention of the Reclamation Service to construct the dam as rapidly as possible thereafter.

Referring also to your inquiry in regard to the project of the Minnesota Canal and Power Company, involving the diversion from the Rainy river drainage system into the St. Louis river drainage system in the State of Minnesota of some portion of the waters tributary to the boundary waters between that State and Canada. I have the honour to inform you that the status of that project has not changed since the treaty referred to was signed. Prior to that time (as stated in this Department's note to you of January 13, 1908) the application of the Minnesota Canal and Power Company for leave to make the proposed diversion of water had already been approved, by the War Department, subject to the condition that the Company should construct, under the direction of, and as required by, that Department, such supplemental dams and reservoirs 'as it may be found necessary to require at the time of executing the work to avoid interference with the navigable capacity or public use of the waters of Birch lake basin and the other various lakes and streams to which they are tributary.' It was further stated in that note that:—

It is understood that the condition thus imposed was drawn with a view to meeting the difficulties presented in the report of the International Waterways of the Department of State that the interests on both sides of the border should be equally protected, precisely as if they were all within the category of those that the War Department was bound to protect.

The amount of water which it is now proposed to use is only a small part of that which, in any view of the subject, the citizens of the United States would

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be entitled to use under an equitable distribution, and while the effect upon navigation under any conditions would be almost a negligible quantity, the proposed remedial or storage works are intended completely to do away with any detrimental effect whatever upon navigation.

The interests on both sides of the boundary in the preservation of boundary waters for navigation and other appropriate uses are identical, and the conditions which the War Department is bound under our laws to impose for the protection of those interests on the American side will necessarily prove equally advantageous to the interests on the Canadian side.

The Minnesota Canal and Power Company will be obliged to construct the necessary remedial and storage works required by the War Department before it will be permitted to put into operation its plans for the proposed diversion of water; but owing to the temporary suspension of this project pending the ratification of the Treaty referred to, the War Department has not as yet undertaken to determine the exact character or location of the dams and reservoirs which will be required for that purpose.

In response to your suggestion that the St. John river commission be authorized to investigate and report upon the feasibility and advisability of constructing a dam for the storage of surplus waters tributary to the St. John river, which could be released at the beginning of the dry season in order to prolong the period for floating logs on that river, I have the honour to inform you that I am prepared to instruct the American members of that commission to examine into this question and report thereon either jointly with or independently of the British members as may be desired.

You will perceive from this note and from the letter of the Secretary of the Interior which is enclosed, that it is the definite intention of this government to proceed with the storage works on the St. Mary and Milk rivers, the construction of which the Dominion government regards as essential for securing the Canadian interests in a due supply of water in that part of the Milk river which passes through Canadian territory.

You also perceive that as regards the Rainy river, it is the settled purpose of this government, in assenting to the project of the Minnesota Canal and Power Company or to any other project involving the diversion of water flowing into the Rainy river, to take all requisite steps, by dams and reservoirs if necessary, to secure an adequate supply of water in the Rainy river for navigation purposes, which would have to be done in any case in the interests of citizens of the United States navigating that river.

I trust that you will consider that the questions which were addressed by Your Excellency and Mr. Pugsley, the Canadian Minister of Public Works, to the Department on these points, are now answered in a manner satisfactory to His Majesty's government and the government of the Dominion of Canada.

I have, &c.,

(Sgd.) P. C. KNOX.

Enclosure from Interior Department, January 3, 1910.

H. E. The Rt. Hon.

JAMES BRYCE, O.M.,

Ambassador of Great Britain.

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DEPARTMENT OF THE INTERIOR,

WASHINGTON, January 3, 1910.

The Honourable

The Secretary of State.

SIR,—In reply to your letter of December 24, with reference to construction of a dam in the St. Mary's river, at the outlet of St. Mary's lake, in northern Montana, I have the honour to state that there has been no change in the status of the plans referred to, and which have been discussed in the various annual reports of the Reclamation Service.

Work on the construction of a canal from St. Mary's lake to the head waters of Milk river has been continued during 1909, and a considerable portion of the canal has been excavated. It is proposed in 1910 to continue this work at a moderate rate until the treaty is disposed of. The canal, of course, will have no use or value unless the dam is built at the outlet of St. Mary's lake, raising the water to bring it into the canal.

In the meantime, material is being accumulated and work carried on economically in the hope that the treaty referred to will be completed at an early date.

There has been no change in the plans since the treaty was signed, and it is still the intention to construct the proposed dam as rapidly as possible after the treaty goes into effect.

Respectfully,

(Sgd.) R. A. BALLINGER,
Secretary.

OFFICE OF THE MINISTER OF PUBLIC WORKS OF CANADA,

OTTAWA, January 20, 1910.

MY DEAR SIR WILFRID,—In compliance with your request, I have given careful consideration to the despatch of the Right Honourable James Bryce, British Ambassador at Washington, to His Excellency the Governor General, dated the 4th of January, 1910, and to the copy of letter from the Honourable P. C. Knox, Secretary of State for the United States, dated the 3rd of January, 1910, accompanying the same, in reference to the Boundary Waters Treaty, so far as relates to the apportionment of the waters of the St. Mary's river and Milk river, and the proposed dam which the Secretary of State says the United States government intend to construct upon the St. Marys' river.

I observe that Mr. Knox states that it is the definite intention of the United States government to proceed with the storage works on the St. Mary's and Milk rivers, 'the construction of which the Dominion government regards as essential for securing the Canadian interests in a due supply of water in that part of the Milk river which passes through Canadian territory.' There seems to be a misapprehension on the part of the United States authorities in reference to the mode in which Canada would expect to derive an advantage from the construction of such storage works. The principal benefit which would be derived by Canada from the construction of these works would be the securing of an increased and regular supply of water for irrigation purposes by means of the St. Mary's river, because the flow down the Milk river would be very much more for the benefit of irrigation work in the United States than in Canada.

The letter of Mr. Knox would seem to indicate that the primary object of the United States government in constructing the proposed dam would be to divert the stored waters of the St. Mary's river by means of a canal to the Milk river, down which such stored waters would flow to that portion of the State of Montana, which is east of the point where the Milk river would recross the boundary into the United States.

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The expression of Mr. Knox of the intention of the United States government to engage upon these large and expensive works for the purpose of storing and conserving the waters for the benefit of both countries, would clearly indicate an intention that the commissioners should equally divide the stored waters, as well as the natural flow of both rivers, which are, under the treaty, to be regarded as one, in such manner as would prove most beneficial to each country; but this object would be defeated if the dam were so constructed as to only provide for carrying the water stored thereby to the Milk river by means of the proposed canal. For this reason, I regard it as essential to an equally beneficial division of the waters of both rivers that provision should be made for a due proportion of the stored waters of the St. Mary's river being allowed, under direction of the commissioners, to pass down the St. Mary's river into Canadian territory, instead of all stored waters being diverted to the Milk river.

If the United States authorities take this view, and give an assurance that in the construction of the dam provision will be made for the passing of the stored waters down both the St. Mary's and Milk rivers, in order that they, as well as the natural flow, may be divided in accordance with the spirit of the treaty. I am of the opinion that such assurance will be satisfactory, and remove a ground for serious criticism, which would otherwise be made against the treaty by those interested in irrigation projects upon and in the vicinity of the St. Mary's river, in Alberta.

I am, my dear Sir Wilfrid,
Yours faithfully,

WILLIAM PUGSLEY.

The Right Honourable
Sir WILFRID LAURIER, G.C.M.G.,
Premier of Canada.

WASHINGTON, D.C., February 4, 1910

Hon. WM. PUGSLEY.

DEAR DOCTOR PUGSLEY.—I met Mr. Chandler P. Anderson and Mr. Newell, Director of the Reclamation Service, at the Embassy to-day. Mr. Newell made the following statement:

In the original scheme of the Reclamation Service they proposed to take the water out of St. Mary's river by a canal at the river level, and to build a dam to provide storage in the lakes behind. As you will see in George C. Anderson's report, a dam fifty feet above the river level would give them 250,000 acre feet storage, or, if only thirty feet high, 150,000. The canal starting at the river level would give them very difficult work along the side-hill before they would get out of St. Mary's valley, and more recent surveys have shown that these difficulties are so great as to amount to impracticability. Consequently, they have raised the level of their canal, and now propose to take the water out at a height of 25 or 30 feet above the natural level of the river. Their dam would now be about 40 feet high for purposes of diversion primarily, not of storage. The only storage such a dam would afford would be the quantity of water impounded between the canal level and the top of the dam, which, he says, would be 40,000 or 50,000 acre feet at most.

From the nature of the foundation (glacial gravel and shingle), he doubts the possibility of raising the dam any higher. He says, indeed, that if the diversion dam proves sufficiently stable they will increase its height little by little, but that he cannot enter into any engagement at the present time to do so.

The diversion dam as proposed with the limited storage incidental to it will not be sufficient (with the canal carrying 850 cubic feet per second, which they propose to build) to take care of their half of the river. This statement accords with my own

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knowledge of the difficulty there would be in taking a low level canal down the St. Mary's valley, also with George Anderson's report in regard to the difficulty as to foundations.

He says further that he has talked with the Canadian Pacific Railway engineers, who propose to build a greatly enlarged canal along the basin of Milk river ridge. This canal you will find on the blue print showing existing and proposed irrigation canals. It follows the yellow line south of the existing Canadian canal (red line) from near Lumpy Butte through Milk river reservoir, and thence southeasterly to the existing Milk river canal (red line). Numerous reservoir sites are available on this line, and it may be that money would be better spent in developing storage there than in the channel of St. Mary's river. In view of the statement made as to the impracticability of the storage dam at St. Mary's lakes, I do not see what I am able to say in reply. Mr. Newell will prepare a written statement which will be forwarded to Ottawa, so that you can judge of it yourself.

Mr. Bryce has asked me to join with Mr. Tiltmann in preparing a draft of description of the boundary line in the lower Passamaquoddy bay. This will take a day or two. If it is not necessary for me to return immediately on account of the other matter, I should like to stay to do this, as it will be more convenient for me to attend to it now than to return to Washington for the purpose later on.

Yours sincerely,

(Sgd.) W. F. KING.

From Rt. Hon. James Bryce to Lord Grey.

BRITISH EMBASSY, Washington, February 10, 1910.

MY LORD,—I have the honour to enclose herewith a copy of a letter which has just been received from the Secretary of State in relation to the subject of the storage of water in the dam proposed to be constructed by the United States government in the St. Mary's river, and in reply to the letter which I addressed to the Secretary of State on January the 25th, enclosing a memorandum which embodied the substance of the letter from the Hon. Mr. Pugsley to Sir W. Laurier which you sent me. Mr. Knox's letter enclosed one from the United States Secretary of the Interior. These two letters set out the reasons, based on the physical conditions and nature of the ground at St. Mary's lake, which make it, in the opinion of the United States government engineers, impossible to undertake to store for Canada her share of the waters of the St. Mary's river. They conceive indeed that the dam cannot, so far as at present can be foreseen, be with safety made large enough to store all or nearly all the United States share of the St. Mary's river water, so that this dam will, in fact, be not so much a reservoir as a means for enabling the United States to divert, as provided for in the treaty, its share of the St. Mary's river water into the Milk river, the water of which is to be available for both countries in the manner prescribed by the treaty.

I have discussed this matter at great length not only with the officials of the State Department, but also with Mr. Newell, the head of the United States Reclamation Service, and have had the valuable assistance in doing so of Doctor King, who has also conferred with Mr. Newell on several occasions and has examined the subject with his accustomed thoroughness.

I have, &c.,

(Sgd.) JAMES BRYCE.

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DEPARTMENT OF STATE.

WASHINGTON, Jan. 10, 1910

Rt. Hon. JAMES BRYCE.

DEAR MR. BRYCE,—Referring to your note of the 25th ultimo and the memorandum inclosed therewith relative to the Boundary Waterways Treaty of January 11, 1909, which is now awaiting ratification, there seems to have been some misunderstanding on the part of the Canadian government as to the purposes for which the United States intends to construct the dam at the outlet of St. Mary's lake and the canal between that lake and Milk river in northern Montana in connection with the use of the waters apportioned between the United States and Canada under the provision of Article VI. of the treaty. An examination of that article will show that it provides merely for an equal division between the two countries of the waters of the St. Mary's and Milk rivers with certain prior appropriations of the natural flow apportioned to each side. There is no requirement that the United States shall store any waters for the use of Canada, in fact, no mention is made of the storage of waters, and the waters which the United States proposes to store are to be taken from its half share of the natural flow, and are intended for use on its own side of the boundary. The proposed storage of waters, therefore, by the United States will in no way diminish or interfere with the half share of the natural flow to which Canada is entitled under the treaty.

In order to ascertain, however, if it would be possible to propose some arrangement, independently of the present treaty, to store for Canada some part of the Canadian share of the natural flow of these waters in compliance with the wish expressed by the Canadian government, that question has been taken up with the United States Reclamation Service, and in response to my inquiry, I have to-day received from the Secretary of the Interior an expression of the views of that department on the subject, a copy of which I inclose, showing that on account of the physical conditions where such storage works would have to be located, it would be unwise to undertake, for the present at least, to provide for the storage of any waters in excess of those required for use in the United States. It appears, as a matter of fact, that the United States will be unable to store anything like its own share of the waters of the St. Mary's river. It further appears from the statement referred to that on the Canadian side of the boundary the natural conditions are more favourable for the storage of Canada's share of the water at less cost and with greater assurance of permanence and safety than at the outlet of St. Mary's lake where the works to be constructed by the United States must be located.

I inclose for your convenience a copy of the map prepared by the United States Reclamation Service, showing the region referred to.

I am, &c.,

(Sgd.) P. C. KNOX.

ENCLOSURES.—Letters from Secretary of Interior, February 9 and 10, 1910, with map.

DEPARTMENT OF THE INTERIOR,

WASHINGTON, February 9, 1910.

The Honourable

The Secretary of State.

SIR,—With reference to the inquiry made informally by your department as to whether it will be practicable to provide storage in St. Mary's lake, Montana, for water to be used in Canada, it is necessary to state that this inquiry must be answered in the negative. The engineers of the Reclamation Service show that the physical conditions are such that it is impracticable to provide storage for an amount

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of water greater than that which, under the terms of the treaty, is subject to storage by the United States. It may ultimately prove to be practical to hold more water than now seems feasible, but in view of the uncertainty, it would be unwise to plan to store in the United States a portion of the water which is ultimately to go to Canada.

Investigation made by the Reclamation Service at the outlet of St. Mary's lake in the United States show that the foundations of any dam must rest upon gravels washed into St. Mary valley by Swift Current creek. The construction of a high dam at present is unwise, or until a low structure has been built and thoroughly tested by years of use. It is proposed to build an earthen dam which will increase the available depth in lower St. Mary's lake by about 30 feet, and turn the water into a tunnel at the head of the canal now being built to carry water from St. Mary's lake to the north fork of Milk river.

In this connection emphasis should be laid on the fact that the dam at the outlet of the St. Mary's lake is primarily a diversion dam, and that its purpose, first, is to raise the water of the lake to give it sufficient depth and volume to flow into the tunnel at the head of the canal, the opening to which may be some distance above the river bed, final conclusion not yet being made as to the particular plan to be adopted as an open cut may be substituted for a tunnel when construction is begun.

Without such a dam raising and diverting water, it would not be practicable to create sufficient head to force water into the canal, the height of which is governed by the nature of the ground and the altitude of the pass which must be surmounted in the route between the St. Mary's drainage and the Milk river drainage.

It may be found, after the dam has been completed and thoroughly tested by the lapse of years, that larger storage can be provided by raising the dam or by building additional dams. The water held in the lower portion of the lake below the level which is necessary to be maintained to fill the tunnel cannot be considered as available and remains inert in the lake bottom and cannot be drawn out, being replaced in course of time by the silt which may accumulate in the dead water.

The natural conditions north of the International boundary in Canada are more favourable for water storage at reduced cost and with great assurance of permanence and safety of the structure

Very respectfully,

(Sgd.) R. A. BALLINGER,
Secretary.

DEPARTMENT OF THE INTERIOR,

WASHINGTON, Feb. 10, 1910.

The Honourable

The Secretary of State.

SIR.—Supplementing the letter of yesterday from the department with reference to the proposed St. Mary's lake dam and canal in northern Montana, it is proper to add that the engineers of the Reclamation Service are of the opinion that on account of the physical conditions where the proposed works must be constructed, the amount of water which can be stored, for the present at least, will probably not exceed one-half of the share of the natural flow to which the United States is entitled under the terms of the pending treaty.

Very respectfully,

(Sgd.) R. A. BALLINGER,
Secretary.

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MEMORANDUM UPON MR. GEO. G. ANDERSON'S REPORT, DATED 18TH SEPTEMBER, 1909, UPON ARTICLE 6 OF THE INTERNATIONAL WATERWAYS TREATY.

In the bound copies which Mr. Anderson has furnished, the report proper, with tables, occupies 56 pages. There follow appendixes, amongst which is a copy of his report to me, of April 22, 1908. In the following discussions this will be referred to as the 'former report.' It should be noted that the two reports are paged independently.

It will be convenient to discuss the report closely, adhering to the order of the objections (a) to (f) stated by Mr. Anderson on the first page.

Objection (a).

That the equal apportionment does not take cognizance of the relative areas which it is possible to reclaim in the two countries.

The relative area is put by Mr. Anderson (Report, p. 15) at—

United States.. . . .	200,000 acres.
Canada.. . . .	630,000 acres.

On this principle the United States should get only 20-83, or less than one-fourth of the whole supply.

Such a principle of division might well be adopted if all the territory were within one country. This, however, is not the case, and there is no rule of international law which can be appealed to in support of the principle.

On the other hand, international law rather tends to support the claim of the United States to the right to deal at will with rivers within their own territory, without servitude upon the waters in favour of persons living outside of their territory.

The extent of the obligation which may rest upon the United States in regard to the existing works on the Canadian side will be further considered when dealing with Mr. Anderson's objection (b). In this place it seems sufficient to point out that existing rights and prospective future extension of them are different things. The United States may, not unreasonably, decline to extend to the latter, to the detriment of their own development, the recognition which they may give to the former.

Hence, both principles, of legal rule and of moral obligation, failing, it is impossible to press an argument for division of water pro rata of lands available for irrigation. The principle of division must be arrived at by agreement.

In negotiating an agreement, consideration had to be given to the fact that the sources of both the rivers are in the United States, and that it is physically possible to divert the greater part of the waters, if not all, within the United States and without touching Canadian territory.

Canada is powerless to prevent this, or to retaliate, for the channel of the Milk river may be dispensed with by the United States for the transport of the water. Though the alternative route would be costly, it has not been denied that it is an engineering possibility.

The cost of this alternative diversion (*via* the Marias river) was discussed by Mr. Anderson in his former report. He puts the cost (p. 22) at \$3,000,000 to \$5,000,000. At the higher figure, adding \$1,000,000 for laterals, &c., and computing on the basis of 200,000 acres of irrigable land, this would amount to \$30 per acre, which, Mr. Anderson argues, would be a prohibitive charge upon the land under the provisions of the United States Reclamation Act which requires that the cost of irrigation shall be a charge upon the land, to be repaid within a certain length of time.

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However, elsewhere (former report, page 56) he shows the value of irrigated lands in various parts of Montana. From this it appears that the value of irrigated land on the lower Milk river is \$40 per acre. He puts the value of the water right at half the value of the land, *i.e.*, in this case at \$20.

This would justify the expenditure of \$4,000,000 to irrigate 200,000 acres.

However, if the water right at \$20 is half the value of the land, the value of the land without water would be \$20, which seems a high price* for unwatered land in that section, reputed to be much more arid than Southern Alberta.

The inference is that the land could stand a higher charge than \$20 an acre, though possibly it might not be practicable in the administration of the Reclamation Act to collect a heavier charge from the private owner.

But in view of the fact that the value of land is continually increasing, it might be considered by the United States to be to their advantage to modify their reclamation policy, and to pay a part of the cost out of the treasury.

Or, if not bound down by a treaty to deliver a certain quantity of water to Canada, the work might be done at any future time. When lands in the district mentioned come to be worth \$60 per acre it will pay commercially to expend \$6,000,000 to reclaim 200,000 acres.

Further, it seems that the Marias diversion canal would pass through or near the eastern section of the Blackfoot reserve where it is said there are 100,000 acres irrigable, and this land could probably be served by the same canal at little additional cost.

Then, instead of 200,000 acres, we must reckon upon 300,000, which at \$20 per acre would justify the expenditure at the present time of \$6,000,000.

At two acre feet to the acre, this irrigation would make a draft upon St. Mary's river of 600,000 acre feet per annum, the average total annual flow being 769,000. It would require, however, a larger canal than that estimated for to carry this amount of water during the open season. The canal carrying 850 cubic feet per second, upon which Mr. Anderson's figures are based, would carry in nine months' flow about two-thirds of this only. Nevertheless, if the canal were once built, there is no doubt that it would later on be enlarged to a capacity to carry all the water that would be required.

These considerations show that an agreement for the apportionment of the water was advisable from Canada's standpoint as well as from that of the United States.

In the present arrangement the share of each is declared to be one-half. Equal division is, of course, in accordance with the general principles of the Waterways treaty, and is in a sense a natural principle having regard to the equality of nations.

Objection (b).

That the equal apportionment does not recognize, as a vested right, the prior appropriations made by Canada on the St. Mary river.

The Alberta Railway and Irrigation Company's authorization of May 3, 1899, grants it 500 second feet of the low flow, and 2,000 second feet of the high or flood flow of St. Mary's river, with fifteen years from October 23, 1902, in which to complete the work.

Their canal, originally built to carry 400 second feet, was enlarged in 1907 to a capacity of 800 second feet.

On page 19 and following pages of his report, Mr. Anderson discusses the laws and court decisions relating to priority of appropriations in the western states.

The requirements to secure and to retain priority of a water right are, first, due notice of appropriation, and, second, due diligence thereafter in applying the water

* School lands near Lethbridge brought an average of \$11.50 per acre at public auction last July.

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to beneficial use. In the present case the first requirement has been fulfilled by the authorization of 1899, and Mr. Anderson states that the development since the company's canal system amounts to 'due diligence,' as the term is understood in the arid states.

As a consequence of this doctrine, any diversion of water from the river above the company's works, except of the surplus over the amount of their appropriation would be a violation of their rights.

It will be seen from the table on page 3, that 2,000 feet per second during the seven months of the irrigation season, from April to October inclusive, is in excess of the supply in every month except June and July of the average year, leaving in June 1798 second feet and in July 301 second feet. That is for practical purposes the company's authorization calls for the whole river, and no use could be made of the water by the United States.

The difficulty of applying the doctrine of appropriation rigidly under such conditions is evident. Mr. Anderson, on this point, quotes (page 20) from a letter written by the late John Hay, Secretary of State of the United States, to the British Ambassador, dated February 19, 1903 (Mr. Anderson wrongly gives the date as 29th December, 1902).

In this letter Mr. Hay said: 'It is proposed to deal with this matter in strict conformity with the laws concerning the right to the use of water as recognized by the courts of the arid region both on this side of the international boundary and on the other. The principle may be stated in the language of section 5 of the Reclamation Act of June 17, 1902 (32 Stat. 388).

"That the right to use of water shall be appurtenant to the lands irrigated and beneficial use shall be the basis, the measure and limit of the right."

This Mr. Anderson puts forward as a definite and official promise by which the United States should be bound to respect the appropriation of the company. The argument is as follows. Beneficial use, technically, under court decisions means not only the actual application of water to the land, but also the intent to do so, as shown by notice of appropriation and 'due diligence' in construction of works for the application of the water to the land. Hence, Mr. Hay in effect recognizes the right of the company to 2,000 second feet for St. Mary's river.

I do not think there is much force in this argument. The United States would probably say in reply that, if they are bound by Mr. Hay's words, they are bound only in the sense in which he personally intended them.

That by 'beneficial use' he meant merely actual application to land appears by his reference in the same letter to a careful investigation of the river made by the engineer in charge of the work in Montana with a view to determining the amount of the water to which claim might properly be advanced in Canada.

If he had meant 'beneficial use' on its wide technical sense, he would not have referred to a local examination as determining the rights of appropriation. He would have had only to consult the terms of appropriation, made four years before, and of which he had been informed, by which the company, under the fictions of the law, would possess the whole river. This he certainly did not intend to promise.

Construing the promise as applying to the capacity of the canal at that date, 400 second feet, this quantity is secured to the company by the provision of priority during the irrigation season to the extent of 500 second feet or so much of that amount as constitutes three-fourths of the flow. This gives more than 400 feet in every month of irrigation season during the average year, except occasionally during extreme low water. Deprived of the benefit of the doctrine by which 'beneficial use' is construed to cover prospective, as well as actual, takings, we have to revert to general principles, according to which, as has been shown, the amount of water to be received by Canada must be settled by agreement.

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If the amount of water coming to Canada is cut down by one-half, the company must necessarily suffer a corresponding diminution of supply. As the whole supply approximates 2,000 second feet, their share would be 1,000.

Taking the table of average flow on page 3, we find that half the river during the irrigation season (with the provision respecting the priority to 500 feet) gives:

In April..	500 second feet.
May..	899 “ “
June..	1,932 “ “
July..	1,150 “ “
August..	520 “ “
September..	500 “ “
October..	443 “ “

Subject to a charge amount to 469 second feet for one month on account of the months during which Canada receives more than half of the river.

On page 4 Mr. Anderson says that in practical operation the company rarely flow water through their canal system before 1st May. They require full volume during May, June and July, their requirements decreasing to 50 per cent in August and to 20 per cent in the other months of the season (of irrigation).

Hence, on a basis of a 1,000 second feet they would have from half the river an ample supply in June and July. In August, requiring 500 (50 per cent) they get 520; in September and October, requiring 200, they get 500 and 443 respectively. The unused April supply could be stored to make up the deficiency in May.

Thus the requirements of a 1,000 second feet canal syystem would be very fully supplied. In fact, this is an under-statement. With the assistance of storage a supply would be afforded on a basis of almost 1,300 second feet. It must be remembered, though, that the figures are an average of different years, and in some years the supply would be much less than the average.

There is also the right to use half of the Milk river waters. Hitherto the company has not used these waters at all. If, as Mr. Anderson suggests, the United States priority there results in giving Canada little of that water, then there is so much the more which may be taken from St. Mary river.

The company therefore still has room for considerable further development, and is probably safe for five years, which is the term of the treaty.

In the above it has been assumed that the 500 second feet (or three-fourths of the natural flow), which Canada is to receive in any event, is to form part of Canada's half share in St. Mary's river, and similarly with 500 feet reserved to the United States on Milk river. This is the way in which Mr. Anderson understands the reservation.

However, the words of the treaty are 'prior appropriation,' and these words taken alone strictly mean, I believe an absolute setting aside of that amount. If there is nothing in the other words of the treaty to modify the effect of these, Canada will get 500 second feet and half of all the rest of the water of St. Mary's river.

Since Milk river falls below the limit during more months in the year than the St. Mary does, such a construction would give Canada more than half of the combined flow of the two rivers.

Objection (c).

That provision is not made for a periodic division of the waters. On page 31 Mr. Anderson states as an objection to the treaty, that it provides for a division of the diurnal rather than the periodic flows.

The treaty, however, seems to contemplate some kind of periodic division, for it is provided that, in making the apportionment, more than half may be taken from

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one river and less than half from the other. This seems to call for the keeping of some kind of account of water supplied, which would have to be balanced periodically.

Also the measurement and apportionment of the water to be used by either country shall 'from time to time' be made jointly, &c

The treaty leaves the determination of the 'times' to the Joint Commission, whose duty clearly will be, in carrying out the intention of the treaty, to bear in mind the 'more beneficial use of each' country.

It is well known that the requirements of different parts of the country as regards water supply are different, as to times as well as quantities, and they will vary in different seasons. It would be impossible to lay down rules beforehand for distribution, with a certainty that they would meet all cases. The needs must be determined by experience.

Mr. Anderson's objection is in part based upon an opinion that the commission may take too long to decide questions which arise and a fear that without an 'oversman' they may devide on national lines.

I suppose, as a matter of fact, the apportionment will be carried on by the irrigation officers, under general rules laid down by the commission, which general rules may be varied as the need arises.

There is no reason to suppose that a body such as the International Joint Commission would not endeavour to carry out the treaty impartially and in accord with its true intent.

Of course it would be possible for them to split on national lines, but so might any body of men. An 'oversman' would of course prevent a deadlock, but where is an impartial oversman to be procured?

Mr. Anderson suggests (page 33) that the commission make the winter flow of St. Mary river part of the share of Canada, allowing the United States to take its half of the whole annual flow during the summer months. Since Canada cannot utilize the winter flow, this would be a great injustice.

It is impossible to believe that the commission would sanction such an unfair division. If neither party uses the winter flow, the summer flow must be divided equally. This seems axiomatic.

In this connection Mr. Anderson points out that there is no provision in the treaty for utilization of the winter flow by storage (by the United States) in St. Mary's lakes.

With proper capacity the whole winter flow might be held. If the United States do this, the amount ought to stand as part of their half of the river, thus giving Canada a further supply during the summer equal to one-half of the winter storage.

Mr. Anderson argues that the United States will not do this, because they can get all the water they need by direct flow from the river during the summer months.

This point will be discussed further on.

Objection (d.)

That the apportionment does not provide for Canada a fair equivalent for the use of Milk river channel for conveyance of water for irrigation.

Mr. Anderson's argument on this point, from page 36 to page 51, reads to me more like an argument on behalf of the United States than a proof that Canada is entitled to 'better terms.'

His argument is as follows:—

Admitting that the United States has sovereign rights over the waters of streams occurring in its territory.

Canada's half share of both rivers in 500,597 feet.

'The United States, however, would not "give up" all of that as compensation for the use of the channel.' He shows that on the basis of the admitted prior right

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to 500 second feet during the irrigation season, and on the basis of a certain computation as to Milk river, the United States must allow Canada as a right.

From St. Mary river..	214,000	acre feet.
“ Milk river..	66,105	“ “
<hr/>		
Total..	280,105	“ “
Canada’s half share being..	500,597	acre foot.
Deducting acknowledged right..	280,105	“ “

The United States gives Canada.. . . . 220,492

This is valued (page 39) at \$10 per acre foot.
Therefore, Canada is given as compensation for the use of Milk river channel \$2,204,920.

‘This represents a saving to the United States over the cost of construction of any other route of, at least, one million dollars.’ (Page 39.)
If this were all that could be said, the objection might well be dropped. Canada is the gainer by the liberality of the United States in paying \$2,204,920 in order to save \$1,000,000.

A better computation, on the same basis, would be:—

The priority of the Canadian canal should be recognized up to its present capacity, 800 second feet. The tables of average flow show that during the irrigation season this canal would take from St. Mary’s river 314,699 acre feet. To this add the amount estimated by Mr. Anderson from Milk

river.. 66,105 “ “

Total..	380,704	“ “
Half the combined flow being..	500,597	“ “

Canada is ‘given’ the difficulties.. . . . 119,893 “ “
Which is worth.. \$1,198,930

The alternative route by Mr. Anderson’s figures would cost the United States an additional expense of much more than \$1,000,000, namely, the difference between \$1,933,000 and ‘between 3 and 5 millions.’

However, taking an equal division as the basal rule, Canada receives nothing as compensation for the use of Milk river channel, except the establishment of that rule and freedom from future disturbance.

Objection (e.)

That the treaty fails to provide any compensation to Canada for the maintenance of the channel of Milk river, or any clearly defined and adequate means of redress in the event of injuries that will inevitably result from its use by the United States in the manner provided.

As to the first part of this objection, Mr. Anderson speaks only of the erosion of the river bed, caused by the greater flow of water, necessitating the erection of highway bridges to replace the existing fords.

This point was considered during the negotiations, but dropped as relatively unimportant. Private damage from the increased flow, such as cutting asunder a farm or ranch, would come under the provisions of Article 2 of the treaty. As to public damage, when the country is settled, the fords will no longer be sufficient for the high roads, and bridges will have to be built under any circumstances.

As to damages for direct injury from the flow of the stream, a provision providing for compensation was proposed, but rejected by the United States negotiators, on the ground that such a provision in the treaty might make them subject to ex-

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cessive damage claims. The assurance was given that the United States government would deal fairly with those suffering damage.

At the foot of page 42, Mr. Anderson infers from the terms of Article 2 that if the Canadian government permitted the diversion from Milk river or any of its tributaries, of water naturally occurring in Canada, so as to conflict with the rights of a prior appropriator in the United States, the latter would be entitled to ask the Canadian courts for injunctive relief and damages for the actual injury.

Under the treaty the permission would not be given by the Canadian government, but by the commission. Clause 2 would hardly apply to their operations under clause 6. If the commission do wrong, the remedy must be sought elsewhere.

He infers also that clause 2 might have the effect of preventing the diversion from Milk river of any part of the water turned by the United States into that river from the St. Mary river. This is also in the hands of the commission to authorize or forbid.

Objection (f.)

The composition of the International Joint Commission is defective and there is lack of provision of methods for its guidance and operation.

The commission will consist of three representatives of each country.

Mr. Anderson says there ought to be an 'oversman.' He says that in the event of an even division of the commission delay would result, and this might cause serious loss. I have dealt with this objection elsewhere.

As to lack of provision of methods for its guidance and operations, Mr. Anderson mentions the question of diurnal or periodic division. This also I have already discussed.

GENERAL REMARKS.

The point in Mr. Anderson's report which, in my opinion, calls for the most serious consideration is the possibility which he calls attention to that the United States may not provide for storage of St. Mary's waters.

They will be able, he thinks, to get all the water they need during the summer by direct flow and without exceeding their share. Consequently the winter flow will not be utilized, because Canada cannot store it, and that amount of water will be wasted.

Records of the flow of St. Mary's river have been kept by the United States Reclamation Service since the fall of 1902. The point of measurement is near the intake of the Canadian canal, a few miles north of the boundary line.

On page 54 of Mr. Anderson's report is a table giving the flow for each month from September, 1902, to December, 1908, inclusive.

From this table, the average yearly flow of the river during that period is 769,374 feet. The average 'winter' flow, that is, the average flow of the five months, November to March inclusive, is 100,643 acre feet.

From the corresponding table for Milk river the total amount of flow of that river averages 231,000 acre feet.

The total flow of both rivers together is, therefore, 1,000,374 acre feet, and the share of each country 500,187 acre feet.

From the table on page 56 it appears that the United States would, under the terms of the treaty, get from Milk river 192,051 acre feet.

To make up their 500,187 acre feet they would therefore require 308,813 acre feet from St. Mary's river.

A canal carrying 850 cubic feet (the capacity contemplated by the United States at present) per second and running for six months would carry this water.

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Or, cutting out the winter flow, which averages on St. Mary's river, 100,643 acre feet, and in Milk river, 51,695 acre feet; total, 152,338 acre feet. The whole summer supply of both rivers, 848,036 feet, of which each country's share will be 424,018 acre feet.

The United States would take their share thus: From Milk river, 140,366 acre feet; from St. Mary's, 283,652 acre feet; total, 424,018 acre feet.

The 850 second feet canal would carry the 283,652 acre feet in five months' flow.

The total acreage irrigable by the United States on the lower Milk river is stated by Mr. Anderson to be 200,000 acres, requiring two feet per acre, or 400,000 acre feet altogether.

Therefore, it will not be necessary for the United States, Mr. Anderson says, to provide any storage on St. Mary's river.

The flaw in this argument is in the fact that Mr. Anderson deals with average flows. The flow of St. Mary's river actually varies very greatly in different years.

Thus, from the table on page 54 it will be seen that the average yearly flow varies from 514,100 to 1,107,294 acre feet.

The general average winter flow is 100,643. The winter flow in 1902-3 was 269,000 acre feet. In 1904-5 the winter flow was 37,000 acre feet.

The following abstract of Mr. Anderson's table will give a clearer idea.

Year.	Summer Flow.	Winter Flow.	Total.
1903..	867,223	240,071	1,107,294
1904..	555,920	54,489	610,409
1905..	461,401	52,699	514,100
1906..	512,200	106,720	619,000
1907..	781,800	53,690	835,490
1908..	846,300	57,610	903,910
Averages..	670,821	94,213	765,035

My average in the last column differs slightly from Mr. Anderson's, because he includes the last four months of 1902, which I have omitted. Including the latter months of 1902, the average winter flow is 100,643.

It is at once evident that the average has been greatly increased by the excessive flows of two years 1903 and 1908.

Referring to the table of monthly flows, we see that the excess in these years is largely due to the flow in June.

In June, 1903, the flow was 309,421 acre feet, and in June, 1908, 380,000 (estimated).

This last amount is almost half of the yearly average. Also in June, 1907, the flow was large, 253,000.

The flow during these three Junes were:—

1903..	309,421 acre feet	=	5157 cubic feet per second.
1907..	253,000	"	=4217 " "
1908..	380,000	"	=6333 " "

However, the flow of the river was not uniform during these months, and the flow at times was very much greater than the figures show. Thus in the early part of June, 1908, the river, at a rough estimate, was carrying 20,000 feet per second during several days. The river was absolutely beyond control.

It would hardly be possible by any system of storage or diversion canals to utilize to the full extent these large flows.

Probably the amount utilized should not be estimated at more than the average flow of June, 1907, or, say, 4,000 cubic feet per second.

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Making a deduction for the water thus lost, the available summer flow of St. Mary's river should be put at not exceeding 600,000 feet.

The annual average for Milk river is put at 231,820. Of this 51,695 is the winter flow, equivalent to about 170 feet per second during the five months. The United States would get this, for they will have storage reservoirs on the lower Milk river. Canada's share of Milk river Mr. Anderson computes at 38,949 acre feet.

The summer flow of St. Mary's being.. . . .	600,000	acre feet.
The total flow of Milk river.. . . .	231,000	" "
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We have altogether.. . . .	831,820	" "
Of which one-half is.. . . .	415,910	

In the average year, therefore, the United States would have their 400,000 acre feet and 15,910 over. No account has been taken of evaporation, which will considerably reduce the amount, as the water has to be carried a long distance.

Possibly the winter flow of Milk river should not be included. The flow is small and the river sluggish. It would be difficult to get the water to the reservoirs during frost.

If we omit this winter water, the flow of Milk river would be	180,125
And of St. Mary's as before.. . . .	600,000
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	780,125
Half of which is.. . . .	390,062

which is not sufficient for the purposes of the United States.

The foregoing is the condition during a year of average water. It is necessary also to consider a low water year.

In 1905 the summer flow of St. Mary's river was.. . . .	461,401	acre feet.
The whole flow of Milk river was about.. . . .	20,000	" "

Total.. . . .	481,401
Half of which is.. . . .	240,700

Or 159,300, or about 40 per cent short of the requirements of the United States.

Hence it is evident that storage will be necessary of the surplus of a flood year to provide for years of scarcity.

Mr. Anderson, however, points out that their storage may be on the lower Milk river instead of on the St. Mary's. Thereby the winter water of the latter river would be allowed to run to waste. Canada's half of it, varying from 18,000 to 120,000 acre feet, would be lost to her.

Against this is the fact that the United States have been intending to build a canal of 850 second feet capacity only. They will not be able to fill this at all times, as they are subject to the right of Canada to half the river (or more when the Milk river is taken into account also), or to three-quarters of the river when that part falls to 500 second feet or less.

A flow of 850 second feet or so much of such amount as constitutes one-half of the flow of the river, to be reduced when the river falls to 667 feet or lower, to one-fourth of the flow, would give them in the average season about 229,000 acre feet.

This approximately the amount which they should get from St. Mary's river during the average season. In years of high water they should get more in this way, but not more in proportion to the increased flow, because there is always an excess in June and they could not take more than 850 feet at any time with a canal of that capacity.

In low years the quantity would be much less. The conclusion is that to provide for low years, it would be necessary for them either to enlarge the canal beyond 850 second feet, so as to take more in May, June and July, or to build the storage dam at St. Mary's lakes.

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This dam would cost less than enlarging the canal, and would give them at the same time better control of the water. It is probable therefore that the dam will be built.

A reservoir of 250,000 acre feet capacity has been spoken of, and also one of 150,000.

The smaller one would hold all the winter water except in usual years. This water would be run off as early in the spring as possible, so as to empty the dam before the mountain water came down. While this water was coming down, the diversion canal could be run at its full capacity, and the dam closed at the same time.

With a canal carrying 850 second feet on the United States side and the present Canadian canal of 800, and a reservoir of 150,000 acre feet capacity, use could be made as follows (in the average year).

Suppose the canals to be opened on April 1, the reservoir then containing 100,000 acre feet of winter water, the American canal could be run at its full capacity until the end of October.

The Canadian canal could get its full supply during May, June, July and August and the whole of the river during April, September and October.

Approximately 41,000 acre feet would be lost in June, and 40,000 in July, while 8,500 would remain in the reservoir on October 31. The United States would thus get a total of 363,000 and Canada 314,699.

As the share of Canada from both rivers is 500,597 acre feet, of which 39,949 (Anderson, page 56) comes from Milk river, and 461,648 from St. Mary's river, the United States would have diverted more than its share by 146,959 acre feet, which, however, must be reduced by 40,500 acre feet, being one-half of the waste in June and July, leaving about 106,500. This might be delivered to Canada on Milk river.

Or, again, supposing the United States canal to remain at 850 second feet, but the Canadian canal to be enlarged to 950.

Then starting as before with 100,000 acre feet in the reservoir, the United States canal might run to its full capacity throughout the season (except a shortage of about 800 acre feet in October). Canada could still take all the river in April, September and October, and fill her canal in May, June, July and August.

In this way Canada would get a direct supply of 351,599 and the United States 362,976 acre feet. The loss in June and July would aggregate 54,000 acre feet. The United States would then owe Canada 85,000 acre feet, to be repaid at Milk river.

Thus, a reservoir of 150,000 acre feet capacity would save practically all the water of an average year.

It would probably pay Canada better if an agreement could be made to have part of her share delivered at Milk river than to take it all from the St. Mary's by enlarging the present canal.

W. F. KING.

March 1, 1910.

Honourable FRANK OLIVER,
Minister of the Interior,
City.

MEMORANDUM.

With reference to the note from the United States State Department, transmitted by Mr. Bryce, the principal point is the statement that the dam at the outlet of St. Mary's lake is to be primarily a diversion dam, for the purpose of creating sufficient head to force water into the canal, and that storage of any large quantity of water will not be attempted until experience has proved the stability of the foundations.

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It is stated that the intake of the canal may be some distance above the river bed, but this distance is not definitely given; thirty feet is mentioned but this seems to be a tentative estimate subject to modification from the results of further surveys. After leaving the river the diversion canal, as first located, would follow a side-hill for a considerable distance, presenting serious engineering difficulties, both in construction and in maintenance. It seems that to secure a better location they will have to go to a much higher level than the river bed.

In such case, the water below the canal level will be dead water, which cannot be let out of the reservoir, and consequently will not count for storage.

Thus any estimates as to what the United States could do to assist Canadian interests with a storage of 150,000 acre feet behind a dam 30 feet above river level, or 250,000 acre feet with a dam 50 feet high, require modification. The amount of water held below the canal level must be deducted from the total storage.

They say that it is impracticable, (with present knowledge of the physical conditions) to plan for storage of more water than that which, under the terms of the treaty, is subject to storage by the United States.

This is certainly true, if it is necessary to put the canal intake as much as 30 feet above the river level. Between it and the top of a 50 feet dam there would be a storage for about 100,000 acre feet (See reports of the Reclamation Service). This would be insufficient for the requirements of the United States, while a dam of that height, involving a pressure at the base of over 20 pounds per square inch, would be of doubtful stability on the gravel foundation.

It is suggested in the note that storage on the Canadian side of the boundary could be secured at less cost and with greater assurance of permanence than at the outlet of St. Mary's lake. This is corroborated by Mr. J. S. Dennis, of the Canadian Pacific Railway, who has a thorough knowledge of the engineering questions involved. While in the government service above fifteen years ago, he surveyed the whole of that region for the very purpose of ascertaining the possibilities of irrigation by water diverted from St. Mary's river.

His view is that by utilizing the storage facilities of the northern slope of Milk river ridge, Canada can store all her share of the water, and that the storage in the basin of St. Mary's lake would be of little or no service to her.

Respectfully submitted,

(Sgd.) W. F. KING,
Chief Astronomer.

CANADIAN PACIFIC RAILWAY COMPANY.

MONTREAL, March 4, 1910.

DEAR MR. PUGSLEY.—Mr. J. S. Dennis, who is our Superintendent of Irrigation, wrote me from Ottawa, February 16, as follows:—

With reference to the interview had this morning with the Honourable Mr. Pugsley, and Dr. King, Boundary Commissioner, regarding the matter of division of international waters, and to my telephonic communication to you through Mr. Beatty, I send you herewith a copy of Article 6 of the treaty, together with map of Alberta and a portion of Montana.

As you are aware, I know the local situation very thoroughly, not only on our own side of the line, but also on the other, and after very full and careful consideration of the subject, I am quite decided that the division of the waters of the St. Mary and Milk rivers, provided for by Article 6 of the treaty is perfectly fair and amply protects Canadian interests, as a whole, and the Alberta Railway and Irrigation Company, particularly and that we are in a position to store at suitable points in the St. Mary river ridge

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such portion of the high water and flood and flood discharge of the St. Mary and Milk rivers, as must be passed to us by the American authorities under the provisions of section 6 of the treaty.

There is no question whatever, in my mind, that the treaty provides for a division of the waters of these two streams on a thoroughly equitable basis, and amply protects our interests in as far as they are concerned with the Alberta Railway and Irrigation Company.

Mr. Pugsley asked that I would write him a letter to that effect, but I said that I would, of course, desire to consult you before doing so. I am now advising him that he will hear from you direct with reference to the matter, or through Mr. Creelman.

It is probable that Mr. Dennis intended to refer to the Milk river ridge instead of the St. Mary ridge, but I am giving the exact language of his letter.

Personally, I am not sufficiently familiar with the situation, nor have I the requisite technical knowledge, to confirm Mr. Dennis' report, but I would accept it without hesitation if it were made with direct reference to any irrigation work or water supply in which this company was interested.

Yours very truly,

(Sgd.) T. G. SHAUGHNESSY,
President.

Honourable WM. PUGSLEY,
Minister of Public Works,
Ottawa.

March 12, 1910.

MEMORANDUM.

Referring to the statement by Mr. Dennis, quoted in Sir Thos. Shaughnessy's letter of the 4th inst., that Canada is in a position to store her share of the high water and flood discharge of St. Mary river under the proposed Waterways Treaty, I may say that the principal reservoir sites in Canada which may be connected with the St. Mary and Milk river irrigation systems are as follows:—

	Acre feet.
Mary lake reservoir, capacity.....	21,700
Taylorville " "	43,800
Lumpy Butte " "	12,500
Chin Coulee " "	50,000
Shanks lake " "	109,500
Milk river " "	29,000
Brunton " "	67,000
Raymond " "	7,500
Verdigris " "	150,000
Crown Indian " "	100,000
	<hr/> 591,000

Nearly all of these capacities are calculated from contour surveys, the others by careful estimation on less complete surveys.

The average total annual flow of St. Mary river, from observations from 1902 to 1908, is put at 769,374 acre feet; that of Milk river at 231,800 acre feet, or a total, from both rivers, of about 1,000,000 acre feet, Canada's half of which would be 500,000 acre feet, or less than the storage capacity above shown.

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For the purpose of considering St. Mary river alone, we must deduct from the above storage areas that of Shanks lake, 109,500 acre feet, which can be filled from the Milk river only. All the rest can be filled from the St. Mary. They aggregate 480,500 acre feet, or more than half the average yearly total of St. Mary's river.

Raymond, Milk river, Brunton and Verdigris lake reservoirs parallel Milk river ridge, and would be advantageously filled by a high-level canal following the ridge. This canal was located by Mr. Dennis in 1896 to a point high up on the ridge, far enough to indicate the practicability of continuing it to Verdigris lake, &c. The combined capacities of these last-mentioned reservoirs is 253,500.

I think Mr. Dennis, in speaking of storage in St. Mary ridge (by which he meant Milk river ridge) referred to these reservoirs sites mainly, but at the same time to other minor ones situated in the valleys of the ridge. He mentioned the upper part of Pothole creek as one.

The highest water in St. Mary river occurs in May, June and July. The average of six years' observation gives the monthly average as:

May..	1,800 cubic feet per second.
June..	3,864 " "
July..	2,300 " "

In August, the average falls to about 1,000 cubic feet per second.

Calculating on the basis of these averages, a canal having a capacity of 2,000 second feet would carry half the water.

This would indicate the general course which would probably be pursued in utilizing the water, namely, enlargement of the present canal (800 second feet capacity) to, say, 2,000 second feet capacity, from the intake, some twenty miles, to the point where the high level canal following the Milk River ridge would leave the present location. This new canal might then be of 1,200 second feet capacity.

The above averages are for the month. Daily flows will frequently exceed the monthly average, and this would call for development of the reservoirs near the intake, such as St. Mary's Lake, Taylorville and Lumpy Butte, aggregating in storage capacity 78,000 acre feet.

The construction of such a canal would then place the Canadian Irrigation system in a position to take care of its half of the water of St. Mary's River.

The enclosed blue print shows the reservoir sites spoken of, and the approximate location of the high level canal. This I have marked with cross lines, in red.

(Sgd.) W. F. KING,
Chief Astronomer.

Hon. FRANK OLIVER,
Minister of the Interior,
City.

CANADIAN PACIFIC RAILWAY COMPANY.

MONTREAL, MARCH 4, 1910.

DEAR MR. PUGSLEY,—Mr. J. S. Dennis, who is our Superintendent of Irrigation, wrote me from Ottawa, February 16th, as follows:—

With reference to the interview had this morning with the Hon. Mr. Pugsley and Dr King, Boundary Commissioner, regarding the matter of division of International waters, and to my telephonic communication to you through Mr. Beatty, I send you herewith a copy of Article 6 of the Treaty, together with map of Alberta and a portion of Montana.

As you are aware, I know the local situation very thoroughly, not only on our own side of the line but also on the other, and after very full and careful consideration of the subject, I am quite decided that the division of the waters of

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the St. Mary and Milk rivers provided for by Article 6 of the Treaty is perfectly fair and amply protects Canadian interests, as a whole, and the Alberta Railway and Irrigation Company particularly. and that we are in a position to store at suitable points in the St. Mary's Ridge such portion of the high water and flood discharge of the St. Mary and Milk rivers as must be passed to us by the American authorities under the provisions of Section 6 of this Treaty.

There is no question whatever, in my mind, that the Treaty provides for a division of the waters of these two streams on a thoroughly equitable basis, and amply protects our interests in as far as they are concerned with the Alberta Railway and Irrigation Company.

Mr. Pugsley asked that I should write him a letter to that effect, but I said that I would of course desire to consult you before doing so. I am now advising him that he will hear from you direct with reference to the matter, or through Mr. Creelman.

It is probable that Mr. Dennis intended to refer to the Milk River Ridge instead of the St. Mary's Ridge, but I am giving the exact language of his letter.

Personally, I am not sufficiently familiar with the situation, nor have I the requisite technical knowledge to confirm Mr. Dennis' report, but I would accept it without hesitation if it were made the direct reference to any irrigation work or water supply in which this Company was interested.

Yours very truly,

(Sgd.) T. J. SHAUGHNESSY,
President.

Hon. WM. PUGSLEY,
Minister of Public Works.

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